

# Contractors and Engineers Monthly

Vol. 44, No. 8

AUGUST, 1947

\$3 a Year, 25 Cents a Copy

Covering  
the Field

## ● Bridge Construction

Trickiest foundation problem on a high vertical-lift bridge was building a cofferdam around tower footings. See page 1. Three new piers were built on concrete piers and pile bents. Turn to page 57.

## ● Highway Maintenance

State forces underseal an old concrete pavement with asphalt, as told on page 1. A study of maintenance recognition in design stage is summarized, page 83.

## ● County Road Work

Page 2 tells of a county's low-cost road program, its organization, 1947 program, shops, and testing laboratory.

## ● Airport Construction

A runway-extension contract included grading, soil-cement base, paving. Pix on pages 46-47 supplement the story, page 6.

## ● Concrete Paving

Widening a concrete by-pass to 4 lanes included asphalt undersealing (page 11). Safety mall, parking bays, cross-overs, feature a new dual highway. See page 86.

## ● Safety

Do you teach your workers to avoid the dangerous practices in handling heavy equipment which are listed on page 18?

## ● Dredging for Dam

A dredge assembled at the site digs a diversion channel on Clark Hill Dam job in Georgia. See page 21.

## ● Roadbed and Tunnel

Heavy grading and blasting, selected base course, and a 500-foot tunnel advance a new route through mountains (page 27).

## ● Foundation Problems

Wellpoints and special underpinning whip building-foundation problems. See page 31.

A deep experimental caisson has been driven on a batter to rock, page 67 reports.

## ● Gravel-Base Construction

Good native gravel deposits made the contract for a selected sub-base, reported on page 43, no problem at all.

## ● Roadside Development

Erosion control by thorough seeding is stressed in this state's work, which follows construction closely. See page 48.

## ● Pile-Dike Construction

Pile-clump dikes are driven through woven lumber mats to protect a caving bank. Page 52 carries the story.

## ● Dam Job Begun

First contract on Fort Gibson Dam calls for a river-diversion cofferdam. Concrete plans are also told, page 63.

## ● Bituminous Paving

How an old gravel road was rebuilt with a sand-clay base and a bituminous plant-mix wearing course is told on page 70.

## ● Aerial Photos

An article on page 73 describes how a state, with a set of aerial photos, planned its own new expressway.

(You will find "In This Issue" on page 4)

## New High Vertical-Lift Bridge Poses Tower-Footing Problem

**MZ-Type Steel Sheet piling Is Driven 50 Feet Deep In Harbor Mud to Create A Watertight Cofferdam**

By RAYMOND P. DAY,  
Western Editor

★ FIFTY feet beneath the swirling surface of Cerritos Channel at Terminal Island, Calif., workmen have been doing concrete work on what will be the highest and longest vertical-lift bridge on the Pacific coast. It is planned as a major traffic link on the new Terminal Island Access Freeway now under construction by the Navy, and the California Division of Highways as agent for the Public Roads Administration. The bridge will relieve congestion on outlying highways and speed automobiles towards the Naval Base and industrial section of the island.

Started December 24, 1945, the \$5,300,000 lump-sum bridge contract is expected to be finished late in 1947 by United Concrete Pipe Corp. of Baldwin Park, Calif. Though bridge and approach plans were prepared by the California Division of Highways, the final plan review and the administration of the contract is being done by the U. S. Navy's Bureau of Yards and Docks. The Navy has contributed approximately \$8,500,000 to the complete freeway project, and \$4,000,000 has been allocated by the Public Roads Administration.

When United Concrete Pipe Corp. and its subcontractors finish the job, the new bridge will replace two obsolete, temporary structures which carried about 25,000 cars per day during the wartime peak. The new bridge

is being built on approximately the same location as a temporary span built by the Navy, and adjacent to the old steel drawbridge built many years ago.

Dogged by slow deliveries on sheet piling and structural bridge members, and faced with the problem of getting adequate bearing for the foundations 50 feet below the surface of the bay, the job is not exactly easy.

### Design Is Unusual

The surface of the earth is slowly settling in the Long Beach area, due probably to the removal of oil and gas pressure thousands of feet underneath. So designers of the new bridge had to take differential movement of the earth's crust into account. Studies conducted by Commander J. W. Frorath, (CEC) USN, Project Manager of the job, have shown a general settlement over a wide area. Local construction elevation hubs on the job have settled 9 inches in a year.

The bridge design therefore has been partly influenced by this condition, and the guide roller pads can be adjusted plus or minus 2 inches after the bridge is in place to cock it any way necessary. Moreover, alternate structural members in the long bridge approaches are not fixed. They are full-floating. With expansion joints in the concrete deck slab, the finished bridge will be flexible enough to move with the earth, carrying its traffic load.

Altogether it will be 4,000 feet long with its approaches. Two structural fixed spans 206.75 feet long will carry automobiles from the shoreward ends of the approaches to the main towers. The center span, which will be 50 feet above the water in the down position

(Continued on page 75)



C. & E. M. Photo  
Maintenance forces of the Louisiana Department of Highways drill holes in a cracked concrete slab for undersealing with asphalt. They use an Ingersoll-Rand Jackhammer powered by a Le Roi 105-cfm portable air compressor.

## Asphalt Underseals Concrete Pavement

**Holes Drilled in Slabs; Asphalt Pumped in at High Temperatures Levels Road And Waterproofs Sub-Base**

★ MAINTENANCE forces of the Louisiana Department of Highways have been undersealing several stretches of old concrete pavement with asphalt. A typical example of this work was completed last spring by a maintenance unit in District No. 3.

On U. S. 71 north of Lecompte in Rapides Parish, about 15 miles south of Alexandria, a 6-mile section of highway was thus treated. Asphalt was pumped through holes drilled in the slab. There were two purposes in view: to level off the uneven concrete surface to a smooth-riding profile, and to waterproof the sub-base by admitting the bitumen.

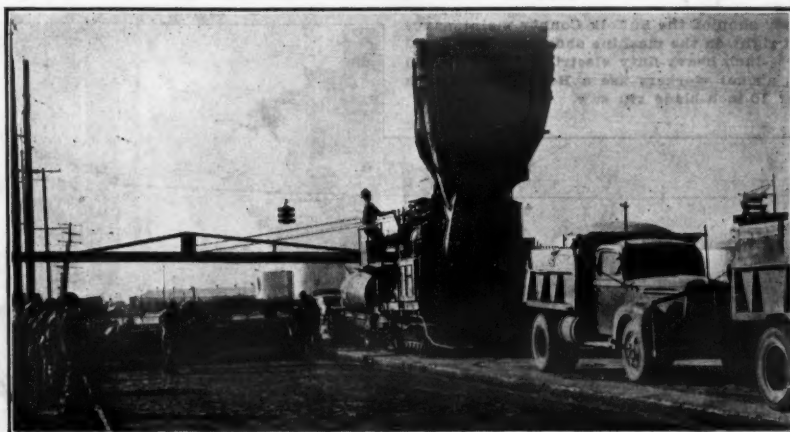
This type of maintenance for concrete highways is fairly new in Louisiana. But the early results achieved have been satisfactory, and more undersealing with asphalt will be done. Maintenance crews have made the initial try-outs of this method. But future asphalt undersealing is expected to be done by contract, since their limited number means that maintenance workers cannot be spared from their other duties to handle this work.

### Drilling Holes

On the job near Lecompte the 6-mile stretch of 18-foot concrete highway is over 15 years old. The 8-inch slabs with expansion joints 50 feet apart were constructed on shallow fills for the most part, 2 to 3 feet high. Common borrow was used to construct the sub-base. During the war this section of road was subjected to terrific pounding by heavy Army equipment from the many training camps clustered around Alexandria. As a result, the pavement has become cracked and broken, while the slabs have settled unevenly. Eventually this piece of road will be widened and resurfaced, so this preliminary undersealing is a logical step in preparing the

(Concluded on page 16)

### CONCRETE PAVING LINE-UP



C. & E. M. Photo  
Here is the paving line-up for the Texas Bitulithic Co. job at Fort Worth, Texas (the story is on page 11)—a MultiFoote 34-E paver with skip raised, Ford and Chevrolet batch trucks waiting to dump to the skip, and finishing machines in the background.



# County's Work Ranges From Roads to Rescues

## Current Activities Feature Low-Cost Road Program Using Local Materials And County Forces

✦ SUFFOLK County, N. Y., has an area of 1,177 square miles. It occupies more than two-thirds of Long Island, and has a population of over 200,000 people. It is bounded on the west by Nassau County, on the north by Long Island Sound, and on the east and south by the Atlantic Ocean. At the eastern end of the island, it is nearly 100 miles long in an east-west direction, and has a maximum width of about 25 miles.

Although chiefly an agricultural county, its adjoining waters have served to promote a large fishing and sea-food industry. Within the past few years, airplane factories along the western border have introduced a new industry. It is also a well known resort area by reason of its long coast line, miles of sandy beaches, and convenient location to a large center of population.

The county seat is at Riverhead, well to the east. But the Suffolk County Highway Department has its main office more centrally located at Port Jefferson on the north shore. Right now the Highway Department has embarked on a program of building its own roads with low-cost local materials which are readily available. These materials are blended and stabilized into well drained and compacted base courses which are then given some kind of bituminous surfacing. Although concrete highways now predominate in the Suffolk County system, no further construction of this type of pavement is contemplated for the present. It is the policy to use the stabilized-construction method; to secure a stabilized base which can be followed later by concrete construction when traffic conditions warrant it.

To insure the best possible base courses, a testing laboratory has been added to the general equipment-maintenance plant at Yaphank. Soils are analyzed and tested there to determine what mixture is necessary for an adequate roadbed design.

### County Organization

Suffolk County is governed by a County Board of Supervisors, ten in number, one for each of the ten townships within the county. Every two years a complete new Board is elected, and its members in turn elect one of their number as Chairman. The Board has jurisdiction over all the county departments, and it convenes on the last Monday of the month at Riverhead.

Each supervisor is elected within his

By WILLIAM H. QUIRK  
Eastern Editor

own township, and is both Township Supervisor and a member of the County Board. The Board appoints the County Superintendent of Highways to a 4-year term of office. Harry T. Tut-hill, the present incumbent, was reappointed in April to another 4-year term, having held the same post for the past eight years.

Funds for the operation of the County Highway Department are derived from the county budget from general-tax funds. Funds for the construction and maintenance of the county highways are allocated by the State on a pro-rata basis from state revenue derived from motor-vehicle registration fees and gasoline-tax money. The allocation received from this source amounts to approximately \$700,000 annually.



C. & E. M. Photo

Looking from west to east along the row of Suffolk County shops at Yaphank, L.I., are the sign shop, laboratory, office, storage shed, main garage and repair shop, and another storage shed.

In addition to this, the County has been allocated \$1,400,000 by the Federal government for the construction of county roads which will connect Federal routes, as part of the national secondary-road program. Little use has been made of this money, however, because of the present high costs of construction.

The County makes its own surveys, and designs, constructs, and maintains all its roads and bridges entirely with its own forces. Not since 1939 has a contract been let for any type of construction. From 75 to 100 are permanently employed by the Highway Department, including an engineering staff which averages 25, with headquarters in Port Jefferson. All surveys and designs of roads and bridges are executed there in modern well furnished offices. These include a blueprint room well equipped for the reproduction of plans. Possibly the only

(Continued on page 80)

## Well Equipped Shops Are Centrally Located to Look After Equipment; Testing Laboratory for Soils Studies

✦ THE maintenance shops of the Suffolk County Highway Department are located at Yaphank, L. I., near the old Army training camp used in both the World Wars. The buildings are strung out on a line from east to west. They are parallel to and about 150 feet north of the main line of the Long Island Railroad, which has a siding in front of them. The oldest buildings have been on the site since 1935 when they were moved there after having been taken off a right-of-way established for a new road. A cinder parking area and a grass plot lie between the railroad siding and the row of shop buildings. On



C. & E. M. Photo

In the Suffolk County laboratory, E. J. Reitano, Testing Engineer, tests the bearing value of a soil specimen on a California-bearing-ratio apparatus made by the American Instrument Co. of Silver Springs, Maryland.

designs are followed, with the signs painted yellow and the inscription painted black. For signs to be read or noticed at night, Scotchlite is used.

Painting the signs by hand or laying out the Scotchlite is done in the smaller west wing. The material comes in 150-foot rolls 24 inches wide, in either yellow, white, or red. The message is laid out on the material, and then the background is painted out so that only the letters will be illuminated at night by the lights of passing cars.

### Main Garage

The newest building, the main garage, is constructed of concrete blocks painted white, and was completed in 1939. It has a front of 82 feet and a depth of 38 feet. There are five overhead doors 10 feet wide x 12 feet high, in front. Last year another wing was added to the east with a front of 48 feet and a depth of 48 feet. It has three front doors of the same type and size. This addition is unheated and is used only for equipment storage. This year a 10-foot strip was added to the back of the original building, making that wing also 48 feet deep, and providing some extra space for shop equipment.

The now 130-foot-long building has a concrete floor. Overhead are steel girders taken from the old Motor Parkway bridges when the structures on this first auto expressway were dismantled.

(Continued on page 90)

### Sign Shop

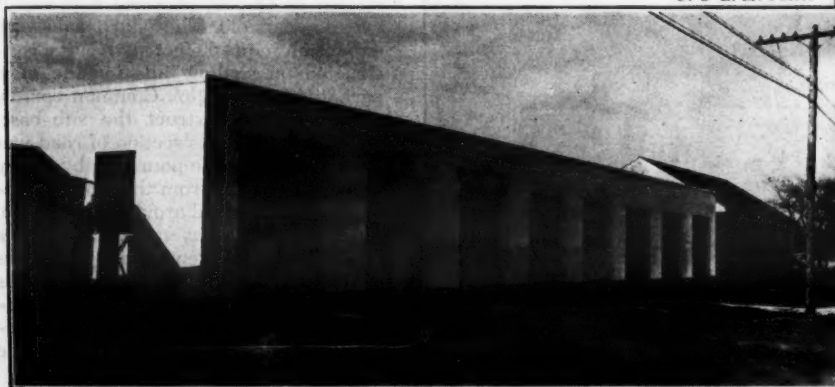
At the extreme west side is the wooden sign shop, with a 36-foot front and a depth of 45 feet along the east wing. On the west side the wall goes back 18 feet and then jogs 12 feet to the east. In the larger east wing all the carpentry work is done on equipment which includes a Boice-Crane 6-inch jointer, a Walker-Turner 10-inch-blade rip saw, and a Walker-Turner band saw, 16 inches x 10 feet long. The signs are laid out on a 4 x 15-foot worktable.

With wood so difficult to obtain, most of the signs now being used are of 16-gauge metal embossed and bonderized with three coats of enamel. The County is in the process of replacing some 5,000 wooden signs with the metal type. Standard U. S. and New York State



Below are the gas pump, main garage, and repair shop of the Suffolk County maintenance shops. The eight overhead doors face south. At right, in the machine shop, a hole is bored in a steel shim with a Black & Decker No. 60 3/4-inch heavy-duty electric bench drill. In the carpentry section of the sign shop (right, above) workers use a Boice-Crane 6-inch jointer and a Walker-Turner 10-inch-blade rip saw.

C. & E. M. Photos







Laying a two-course Texaco Asphaltic Concrete pavement over worn concrete on U. S. Route 13 in Delaware.



Traffic is allowed on half the highway, while the other half is under construction.



The skid-resistant surface of the new Texaco Asphaltic Concrete pavement is an improvement over old concrete.



A section of the 35 miles of resilient Texaco Asphaltic Concrete having laid down on Delaware highways.

# Delaware's cure for 35 miles of ailing highways

Time and traffic had taken their toll on Delaware's two main north-south highways. Large sections of the concrete pavement had become worn and uneven, with the result that motorists found driving rough and uncomfortable.

This year, Delaware is busily engaged in carrying out an extensive resurfacing program on these important routes. In common with many other states and cities faced by the same problem, Delaware has elected to use the old pavement as base for a resilient, heavy-duty surface of Asphaltic Concrete.

During 1947, approximately 35 miles of two-course Texaco Asphaltic Concrete paving will be laid over worn concrete on Delaware State Highways by the Standard Bitulithic Company of New York City and George and Lynch of Wilmington, Del. The speed with which the new pavement is laid, plus the fact that half the highway is paved at a time, subjects traffic to a minimum of delay and inconvenience. Country-wide use of Texaco Asphaltic Concrete over worn cement concrete for over a quarter-century has furnished conclusive proof of its durability and low upkeep cost.

*Call on a Texaco engineer, who is an Asphalt specialist, for practical assistance with your street, highway or airport paving problem. Write our nearest office.*

THE TEXAS COMPANY, Asphalt Sales Dept., 135 East 42nd St., New York City 17

Boston 16

Chicago 4

Denver 1

Houston 1

Jacksonville 2

Philadelphia 2

Richmond 19



# TEXACO ASPHALT



# Contractors and Engineers Monthly

A NATIONAL BUSINESS PAPER  
For the Highway and Heavy-Construction Industry

Issued Monthly by Bittenheim-Dix Publishing Corp.  
Editorial and Business Office: 470 Fourth Ave., New York 16, N. Y.  
Acceptance under the Act of June 5, 1934, at Mount Morris, Illinois,  
authorized March 26, 1945.

William H. Quirk, Eastern Editor  
Raymond P. Day, Western Editor  
Melvin Dean, New Products Editor  
Olive E. Potter, Managing Editor

Edgar J. Bittenheim, President  
George S. Conover, Vice President  
Edwin Wagner, Secretary and Treasurer

Donald V. Bittenheim, General Manager  
Myron MacLeod, Advertising Manager  
Albert T. Miller, Pacific Coast Manager

BRANCH BUSINESS OFFICES

Daily News Bldg., Chicago 6, Ill.  
Duncan A. Scott & Co., San Francisco 4, Calif.  
3275 Wilshire Blvd., Los Angeles 5, Calif.

Copyright 1947 by Bittenheim-Dix Publishing Corp.

## California Passes Its Highway Bill

By a vote of 53 to 24, the California Assembly passed the Burns Highway Bill on June 20, bringing to a close a legislative battle that has been waged since January (see article on page 41). Now the long-range comprehensive highway-construction program envisaged by the famed Collier Committee report is to be a reality.

California is to be congratulated. We believe that she has written an important chapter in the historic record of western economic development—indeed, of the nation itself. For her action sets a precedent almost certain to be followed by other states. We hope that highway engineers and legislators all over the country may gain new courage from California's example, for the highway bill was passed only after a long, bitter, and sometimes losing battle against concerted group opposition.

It is estimated that the bill will produce \$64,000,000 a year in new funds for road construction. The people who use the highways are to pay this sum through nominal increases in registration fees, gasoline and diesel fuel taxes, and a new graduated truck tax. This, it would seem, is eminently fair. The battle might appear to be won.

But we believe the battle is just beginning.

Along with congratulations to California for her currently fine example go a challenge and a great responsibility to her Department of Public Works. This

action of her legislature places the Department under the careful scrutiny of those who may follow, and judge, their leader.

The state highway-construction program will average \$72,250,000 or more per annum, plus Federal Aid. That is big business. It is still bigger business when we consider the usable life of highways built under present authorization, and what their maintenance costs will be.

It will take courage to spend this money wisely and well. It will call forth the best engineering brains and talent to design this highway system. If ultimate value is to be realized from each highway revenue dollar, the per cent of overhead must be kept down consistent with good engineering. To the end that all highway funds be spent on all the highways all the time, the Department must operate without prejudice, free of politics, on a business basis, dedicated to the development of a highway system second to none as proposed in the Collier report.

It is the opportunity of a lifetime. It is a challenge to any engineer. It is like building a new Golden Gate Bridge each year for ten years.

CONTRACTORS AND ENGINEERS MONTHLY salutes the California Department of Highways and hopes sincerely that all hands, under the leadership of Charles H. Purcell, will meet this great challenge successfully.



"It was a tough fight, mom, but I won!"

## Contractors Present Price-Policy Problems

The problem created for contractors by the new price policy of the Public Roads Administration was the subject of a recent meeting which took place in Seattle, Wash. It was the second meeting this year held by the Joint Cooperative Committee of the American Association of State Highway Officials and The Associated General Contractors of America, Inc. Discussion centered around how to make the price policy workable.

The PRA policy, as set forth in instructions issued to division engineers, specifies "that the general price level of Federal-Aid highway work for 1947 should not exceed that of 1946". The contractors agreed that if a spiral of increased costs were to get going with no limit set, a serious condition could develop. But they felt that the present ruling, if too strictly interpreted, would leave them very little margin of play on their bids.

Prices of materials, wages, and equipment so far in 1947 have shown an increase over 1946. This makes it impossible, according to the contractors, to meet price awards no higher than the average of 1946. Moreover, the 1946 prices also increased steadily throughout the year, so an average for that year would be considerably lower than present prices.

Contractors were unanimous in wanting each job evaluated with due consideration of its particular problems, rather than compared with the weighted average of the 1946 program or with set statewide rates.

As a means of reducing costs, the contractors recommended standardization of design as far as possible, and elimination of unnecessary refinements such as hand work. They also reported that while some tolerances and changes in specifications had been generally agreed to by highway officials and contractors, putting them into practice had not been extended down the line in some localities.

## Britain Presses to Free Toll Roads and Bridges

While some American states draw plans for new toll highways, Great Britain is pressing a campaign to free many of its own toll roads, and bridges, the National Highway Users Conference reports.

Concerning this work, Britain's Minister of Transport points out that it is one means of promoting highway progress which involves little expenditure of labor or materials, both of which are in short supply. That some progress has been made is indicated by the fact that in 1933 there were 77 toll bridges and 53 toll roads, compared with today's 58 toll bridges and 41 toll roads.

According to a recent survey there are, in the United States, 25 toll roads, 240 toll bridges, and 6 toll tunnels. However, the NHUC reports that thirteen states have had toll roads under discussion in current legislatures.

## ARBA Plans '48 Convention

The 45th annual convention of the American Road Builders' Association will be held in Washington, D. C., Jan. 26-28, 1948. The principal topics for deliberation will be how to meet today's ever-increasing traffic demands, and how best to spend funds allotted to the 1948 road-building program.

All divisions of the association will hold individual group sessions, and will also participate in the general discussions. More than a score of technical committees will make reports on a wide range of subjects.

Conventionites will also hear about plans and latest developments on the 1948 Road Show to be held July 16-24, 1948, at Soldier Field, Chicago.

## In this Issue

Aerial Surveys	73
Airports	6, 46, 47
Bituminous Paving	70
Book Reviews	78
Bridge Construction	1, 57
Concrete Paving	11, 86
Convention Calendar	56
County Road Work	2
Dam Construction	21, 63
Dike Construction	52
Dredging	21
Editorial	4
Equipment Shops	2
Erosion Control	10, 52
Expressway Planning	73
Foundations	31, 67
Grading	27
Highway Maintenance	1, 83
Legal Decisions	79
Lubrication	37
Road-Base Construction	43
Roadside Development	48
Safety	18
Soils Studies	56
Tunnel Construction	27

## Sound Labor Policy Urged for Employers

A labor-management policy which seeks to create an informed working class and direct contact between employer and employee was urged at the semi-annual meeting of the American Society of Mechanical Engineers in Chicago. John A. Patton, Chicago management engineer, addressed the management session of the meeting, and said the policy "treat them rough and tell them nothing" is obsolete.

He urged that the ever-widening gap between employer and employee be considered and steps taken to provide a more personal contact between the two groups. The main burden in creating and maintaining this relationship must be carried by management.

"The gravity of the situation becomes more obvious when we realize that a well informed employee has the best chance of being a satisfied one. He wants to belong. Knowledge of what is going on makes him feel a part of the operation. His sense of security is increased almost in direct proportion to the amount of information he receives regarding the circumstances which bear about him and his particular position with the company."

## Availability of F-A Funds Extended an Extra Year

The post-war development of an improved highway system was given a boost when the President signed H. R. 1874, amending the Federal-Aid Highway Act of 1944. This amendment extends the time limit on the availability of Federal-Aid funds to two years instead of the one year provided for under the Act.

This legislation will have the effect of saving unobligated funds appropriated under the original act from lapsing at the end of the fiscal year which expired June 30, 1947. These funds, estimated at about \$144,000,000, will now be available for expenditure until June 30, 1948.

## Highways Only as Safe As Drivers Are Careful

Highway safety does not depend entirely upon well engineered roads. This fact is proved by a special investigation into accidents on the Pennsylvania Turnpike carried on by the National Safety Council, as reported by the National Highway Users Conference. This again supports the axiom that a road is only as safe as the driver is careful.

The Pennsylvania Turnpike was built at a time when many advances in road design were available for inclusion. But on comparing the causes of accidents on this road and a comparable stretch of road in another part of Pennsylvania, it was found that the accidents were invariably the result of some human failure.



# LIFE INSURANCE EXPERTS PROVE FORD TRUCKS LAST UP TO 19.6% LONGER!



**N**O LONGER need you guess about which make of truck to buy! Now you can know, beforehand, *which* one of all five sales leaders has delivered the longest service, which has the longest life-expectancy! Ford!

And the proof is *certified* proof! Certified by the same scientific methods used by life insurance companies in computing their rates!

**4,967,000 Trucks Studied.** Wolfe, Corcoran and Linder, noted New York Life Insurance Actuaries, assembled the records of all trucks of the five sales leaders registered from 1933 through 1941—a total of 4,967,000 trucks! Then they prepared truck life-expectancy tables in the same identical manner in which they prepare human life-expectancy tables for life insurance companies.

**Ford Wins!** Up to 19.6% longer life for Ford Trucks! Up to 19.6% longer life than the four other sales leaders! That's what the certified truck life-expectancy tables prove! The reason? Ford knows how to build trucks to last longer. Ford Trucks are built stronger! See your Ford Dealer today. He'll show you why it's good business to wait for the truck with the longest life-expectancy—Ford!

## Certified proof

### FORD TRUCKS LAST LONGER

#### The life-expectancy of a Ford Truck is:

- 13.1% longer than that of Truck "B"
- 3.2% longer than that of Truck "C"
- 7.6% longer than that of Truck "D"
- 19.6% longer than that of Truck "E"

#### OFFICIAL ACTUARIAL CERTIFICATE

Based on the application of sound and accepted actuarial methods to the actual experience as measured by truck registrations, we hereby certify that, in our opinion, the accompanying table fairly presents the relative life-expectancy of the trucks involved.

WOLFE, CORCORAN AND LINDER  
Life Insurance Actuaries, New York, N. Y.



# Runway Is Extended At Western Air Center

**Grading, Drain-Building,  
And 9-Inch Soil-Cement  
Base for Pavement Are  
Done in 40-Day Contract**

(Photos on pages 46 and 47)

★ ONE of the heaviest soil-cement mixing jobs this year has been finished at the Los Angeles Municipal Airport by Morrison-Knudsen Co., Inc., under a \$213,346 contract with the Los Angeles Department of Public Works. The job has extended the main runway A by 1,340 feet, making it now 6,000 feet long and 300 feet wide.

With all major airlines now using the Municipal Airport at Inglewood, it was necessary to extend the main runway to permit landings and take-offs of heavy air traffic. All the heavy commercial airplanes formerly landing or departing from the Lockheed Air Terminal in Burbank now use the big municipal field, which is one of the fastest-growing air terminals of the United States. At the present time the maximum wheel loads are 58,000 pounds. There are about 205 scheduled flights each day, 100 unscheduled flights, and a considerable amount of experimental flying by two aircraft factories located near-by.

Only 40 calendar days from March 31 were allowed for the completion of

borrow pit by a 3,500-gallon sprinkler unit. When the earth reached the fill, it had from 5 to 7 per cent moisture. It was dumped in 6-inch lifts, spread by either a Caterpillar No. 12 or an Adams 512 motor grader, and tamped by a Southwest tandem sheepsfoot roller drawn by a D8 Caterpillar.

All the time that dirt-moving was under way, a traveling truck-mounted Alemite and fuel rig made a regular call once each shift to service the machines. This call was usually made at the



Sub-Base Grading



Culvert Backfill

the new runway extension, this drain was designed to carry surface run-off from the surrounding land underneath the airport and on down an existing watershed.

This drain structure is 10 feet wide, from 18 to 21 inches high, with 13-inch reinforced-concrete walls, a 12-inch deck, and a 7-inch-thick invert. It had to be formed and poured as rapidly as possible, because the Terra-Cobras and Carryalls crowded the work. The invert pours were made first, with the wall and deck pour following monolithically. Truck-mixed concrete from the Consolidated Rock Corp. plant about 5 miles away was hauled by two Rex Moto-Mixers. One 265-foot wall and deck pour was made in the heaviest day, handling about 135 cubic yards in 8 hours.

## Soil-Cement Base

The designers of the new runway extension made plans for a soil-cement stabilized base 9 inches thick, resting on the 6-inch compacted selected sub-base put in by grading equipment. The 9 inches of soil-cement was considerably thicker construction than most airport or highway work in California called for during the past few years.

Just how to handle cement, mix a windrow running 5 cubic feet per linear foot, and maintain the required thickness on a limited cycle of time for the whole processing operation was watched with more than passing interest by John McNerney of the Portland Cement Association and Col. C. L. Bell, Deputy City Engineer under Lloyd Aldrich, who was in charge of the job for the City.

Laboratory tests indicated no great variance in the kinds of soil at the airport. A portland cement content of 12 per cent by dry weight was set up as a guide to follow through the project.

Morrison-Knudsen Co. used a very systematic and thorough sequence of equipment for the soil processing, which ran as follows:

1. The initial windrows of earth were laid 7 feet apart to let equipment work, and their volume was carefully checked after the Caterpillar and Adams motor graders had finished a section. Field

(Continued on next page)



Cement Injection

grading, soil-cement processing, and paving the finished base with 2 inches of asphaltic concrete. Operations therefore had to be tied in very closely with one another to minimize interference.

## Grading

The first big job was dirt-moving. Approximately 70,000 cubic yards of friable sandy soil had to be moved to cut down rolling hummocks and fill in under the new runway extension. Five Wooldridge Terra-Cobras were brought in to move about 80 per cent of the earth an average hauling distance of 1,000 feet. Three Caterpillar D8's were brought in at the same time as pushers, alternating with their bulldozer blades in rough-grading the borrow areas.

The Terra-Cobras worked two 8-hour shifts per day, and disposed of about 60,000 cubic yards. The first fills made consisted of the longest hauls. Dirt was dumped near the existing runway, and as the fill progressed the far side of the extension was built up. Morrison-Knudsen had other work near-by for these machines. So after they had rambled through the biggest part of the earth work, the Cobras were moved on to the other job and the airport grading was finished with three LeTourneau 16-cubic-yard Carryalls pulled by three new Caterpillar D8 tractors. Each of these new tractors was equipped with Caterpillar's new power-control units.

Water was added to this earth at the



Soil-Cement Mixing

change of shifts.

One pocket of soft wet blue gumbo in a deposit about 4 feet thick caused some serious concern until it had all been removed and wasted along the edge of a graded drainage trench, outside the runway line. Early in the work a little tough luck plagued the job for about three days in the form of a high-octane gasoline line, not buried quite as deep as utilities plans indicated. One of the motor graders hooked this line and high-octane aviation gasoline spewed out.

While this leak was fixed up in good time, the ground was saturated and the heavy fumes kept men and equipment away for about three days. It was one



Sheepsfoot Rolling



## Runway Is Extended At Western Air Center

(Continued from preceding page)

engineers checked their height, base width, and slope to insure the right volumetric content.

2. Bulk portland cement was then hauled in by custom-made tankers, and introduced into the windrow by a Gardner cement meter, an automatic measuring device. Hooked on behind the tanker, this meter could be adjusted to the right setting for 12 per cent of cement. Check tests run on this machine proved it accurate within a fraction of a per cent. For each 1,340-foot windrow, 61,640 pounds of cement was required. And when the tanker's weights were balanced at the end of these windrows, the amount of cement that had been injected was found to be within about 200 pounds for the whole length of windrow.

The special tankers, built by Gardner Road Mixers, Inc., had an inverted V inside the tank. This naturally caused the bulk cement to gravitate towards the sides. A screw feeder on each side of the tanker at the bottom of the V fed the cement to the meter. These screws were both driven by a single Ford V-8 engine mounted forward on the tanker bed, behind the truck cab.

As the bulk cement left the tanker it filled a hopper on the Gardner cement meter. Whirling at various speeds depending on the forward speed of the machines, a series of metering buckets were filled with cement and struck off on a stationary bar; they dumped the material in the soil as the machine went along. Manual controls were used to keep the meter hopper level-full behind the tanker, but the automatic metering of cement was set at the start of a windrow.

The cement meter was used by Morrison-Knudsen Co. on a rental basis to excellent advantage. According to the Superintendent and the Engineer on this project, the use of automatic metering permitted them to use bulk cement, considerably easier and cheaper to buy than sack cement. Moreover, no large labor force was needed to haul in bag cement, open the bags, and gather empties up after the cement was spread. Check tests also indicated an accuracy at least equal to the hand method, if not superior to it. Since the cement haul was only 2 miles, two tankers were all that were required.

3. As soon as the cement was introduced, one pass was made through each windrow by a large-model Wood Road-mixer. This machine added the necessary water to bring the moisture content up to 10 per cent, and blended the earth and cement to a uniform consistency in one pass. Two Wood Road-mixers were used so two windrows could be processed at once. Each machine was driven by a Caterpillar D8 tractor through a rear drive, with special gears in the tractors to permit them to travel about 18 feet per minute.

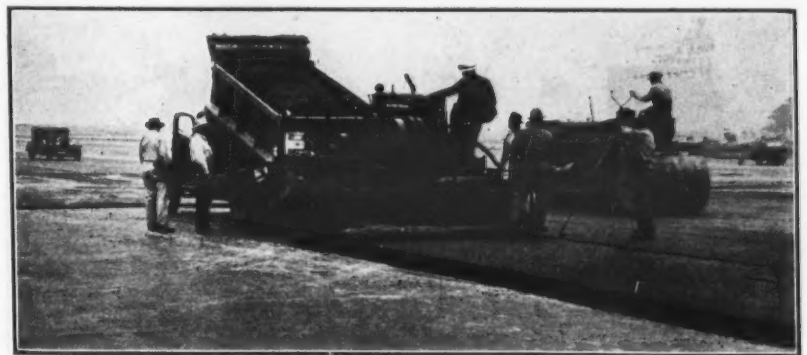
The Wood machines made the trip down a 1,340-foot windrow in from 1 hour and 20 minutes to 1 hour and 30 minutes. A water tank was towed along behind the Roadmixers, hooked to the machines by hose, to furnish the mixing water. Two 3,500-gallon tank trucks were kept busy hauling water from the city supply to these tanks. They were hooked on to the equipment train by a cable sling and pulled along in neutral gear while making the transfer of water.

4. The Caterpillar and Adams motor graders then made the first pass to lay the mixed soil-cement down in place. As they made this first pass, they left the uncompacted material about 1½ to 2 inches high. When they started against the joint of a previous day's run, the soil-cement was bladed in towards the

joint in two lifts, and tamped solidly by sheepsfoot rollers. Aside from this special treatment where a 24-hour-old joint was involved, the blades simply put the soil-cement down as rapidly as possible in two lifts. The final result was a single monolithic slab 9 inches thick without a plane of separation between lifts.

5. A tandem set of Southwest sheepsfoot rollers behind a Caterpillar D8 tractor then moved in rapidly to roll the material until its initial compaction was reached. With warm sunny weather evaporating some of the moisture, a small tank sprinkler truck was used to replenish water as the sheepsfoot rolling progressed. Sheepsfoot rolling was continued at least until the initial compaction had been reached. At that stage the tamper feet were fairly well up in the clear, with some daylight showing between the roller body and the bottom of the feet.

6. Two Bros Wobble Wheel pneumatic rollers, one drawn by an International tractor and one by a Euclid,



C. & E. M. Photo

A dump truck discharges hot-mix asphaltic concrete to a Barber-Greene finisher for the runway extension at Los Angeles Municipal Airport. A Buffalo-Springfield roller works on lifts just laid. This is a transition section and is being laid an inch thicker than the rest of the runway.

were then used in conjunction with a water-tank truck to roll the lift to its final compaction. These pneumatic rollers were ballasted to 10 tons, and made repeated trips until no further compaction was possible by field equipment. Carefully prepared density tests were

run in the field on most of the windrows, and the final rolling was correlated with the findings on those tests. The specifications required 95 per cent of Proctor density (ASTM D-588-44).

7. A finish motor grader then passed

(Concluded on next page)

# MORE COMPACT LESS WEIGHT

## Greater Power



# SULLIVAN HOISTS

MULTIPURPOSE...  
TIME AND COST  
SAVERS

**SINGLE OR  
DOUBLE DRUM  
TYPES  
4 TO 10 H. P.**

Sullivan's all steel construction, plus the use of strong, lightweight alloys, assures utmost mobility and compactness. There's greater service, too, in the Sullivan double-life gears and large diameter rope drums.

**AIR, GASOLINE  
DIESEL OR  
ELECTRIC DRIVE**

SULLIVAN DIVISION

**JOY MANUFACTURING COMPANY**

General Offices: Henry W. Oliver Bldg., Pittsburgh, Pennsylvania



C. & E. M. Photo  
Workmen rake out a transition joint to blend new runway construction with old pavement on an end-of-the-contract shift. Warren-Southwest, Inc., held a subcontract for this work on the Los Angeles Municipal Airport job.

## Runway Is Extended At Western Air Center

(Continued from preceding page)

over the compacted strip, blading away any excess soil-cement. Blue-tops set at this stage were used as a constant reference in blading the base to grade.

8. Several more passes were then made by the pneumatic rollers, with a very light sprinkling, to seal the surface. All windrows laid down and processed during one day's run were cured out for about 24 hours, with occasional light sprinkling. They were sealed at the start of the next calendar day by an application of 2/10 gallon of mixing-type D-grade asphalt emulsion per square yard.

Early in the job, when men new to the equipment being used were as yet unfamiliar with exactly what was required, it was necessary to build an extra windrow with the motor graders after about three regular windrows. This operation gave full depth to the soil-cement processing and insured the right amount of strength in the finished construction. It was a special step, however; not part of the regular routine.

### Bituminous Paving

The 2-inch asphaltic-concrete surface was put down in short order under a subcontract with Warren-Southwest, Inc., of Los Angeles. The hot-mix as-

phalitic concrete was hauled in to the airport from Warren-Southwest's plant at 203rd and Crenshaw, about 6 miles away. Two Barber-Greene finishers

were used to receive and spread the mix. About  $\frac{3}{8}$ -inch compaction allowance was made on the 2-inch layers as they went in. A Buffalo-Springfield 12-ton three-wheel roller and a Buffalo-Springfield 8-ton tandem were used to compact this surface.

The job just finished will now permit heavy commercial planes to use Los Angeles Municipal Airport with a greater margin of safety in landing or taking off. All during the construction, giant four-engine planes hurtled skyward only 100 feet or so above the heads of equipment operators. It was a constant reminder that these great planes need more room to operate.

The new extension, with its 30-foot drain gutter and 115-foot graded and rolled section outside each edge of the runway, is not the ultimate development of Los Angeles Airport. Plans are being made for further extension of this main runway, with more terminal buildings and facilities on the west end. When that extension is done, Sepulveda Boulevard will be tunneled under the

existing airport if present plans are followed.

Already the Civil Aeronautics Administration has installed an Instrument Landing System (ILS) at the airport to make it one of the most modern and safe in the west.

### Personnel

The project was designed by the Bureau of Engineering, under the direction of Lloyd Aldrich, City Engineer, and administered by former Colonel C. L. Bell, Deputy City Engineer. Field supervision for the City was in charge of Yarn Ostendorf, under the direction of C. E. G. Wikoff, Inspector of Public Works. On-the-job officials for Morrison-Knudsen were Martin Green, Superintendent of the company's Highway Division for Southern California; Project Engineer William Thompson; and General Foreman Gornard Keller, who also directed the grading.

Lyman Wilbur is now the Los Angeles District Manager for Morrison-Knudsen Co., Inc.

# THROUGH THICK...



# ...AND THIN!

Horatio Alger heroes never struggled harder than do research laboratory technicians today. The intent scientist above is a Sinclair Research technician... a skilled specialist at determining how thick or how thin Sinclair lubricating oils must be for specific applications.

With the important Fitzsimons Viscometer, a research measuring apparatus of fine precision, Sinclair Laboratory experts are able to determine with extreme accuracy viscosity characteristics in their studies of lubricants needed to protect your valuable machinery. Precise, accurate flow measurement provides information important in the development of improved products for correct lubrication with light-bodied oils for today's precision-built engines and machinery.

This viscometer is one of several different types with which Sinclair Research goes through thick and thin to assure you of industrial lubricants of proper viscosity. It is typical of the equipment and facilities which are constantly at your service in developing Sinclair lubricants of uniformly high quality to suit your specific application.

### Sinclair Automotive Oils

For Bus, Truck and Tractor

## OPALINE TRUCK BUS TRACTOR OIL

Superior lubrication in the long  
pull, under heavy loads

Keeps engines clean...  
Sustains top engine performance

SINCLAIR REFINING COMPANY • 630 FIFTH AVENUE, NEW YORK 20, N. Y.

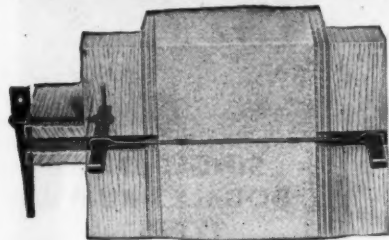
# SINCLAIR

## Lubricants for Industry

FINEST CRUDES + EXPERT RESEARCH

and MANUFACTURING CONTROL = OUTSTANDING PERFORMANCE

## SYMONS FORMING SYSTEM



### Up Profits

### Down Costs

There is no nailing... no drilling for ties... no plugging up old tie holes... no spreaders are necessary... only one waler per wall... ties are placed where the panel is strongest. Simple to erect and dismantel. Guaranteed uniformity throughout the foundation. Symons forms are your answer to simple low cost foundation construction. Write today for complete details and prices... also ask about our Column Clamps and Safety Shores.

FOR RENT AND SALE

SYMONS CLAMP & MFG. CO.  
4251 DIVERSEY AVE., CHICAGO 39, ILL.





The new Winpower post-hole digger is shown here mounted on an Allis-Chalmers tractor. The fence guard holds back the fence while the machine digs post holes in the fence row.

### Post-Hole Digger Made in Two Models

Feature of a new post-hole digger made by the Winpower Mfg. Co., Newton, Iowa, is a guard which holds back the fence while the machine digs post holes in the fence row. Another feature of the Winpower is a cone-clutch control said to increase flexibility in the use of the digger by adjustment to ground conditions.

The digger is adjustable forward and backward for hillside and angle digging. The replaceable cutting edge of the auger is made of abrasion-resistant steel. Available auger sizes are 6, 9, and 12-inch.

The new digger comes in two models. The Model F is for use on Ford-Ferguson tractors where the up-and-down action of the auger is controlled by the hydraulic lift found on Ford-Fergusons. The Model U is said to fit most Allis-Chalmers, International, John Deere, Massey-Harris, Oliver, and other tractors having a rear-end power take-off.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 28.

### Rotating Hand Drill

A drill which hits and rotates at the same time is made by the Pneumatic Tool Sales & Repair Co., Inc., 14-29 33rd Ave., Long Island City 2, N. Y. One-hand-operated, the Holewizard is designed to drill holes in concrete, brick, mortar, stone, and similar materials. With a simple adjustment it can also be used for chipping.

The Model 400 will handle drills from 1/4 to 3/4 inch. Length with the retainer is 16 inches. Weight of the unit is 8 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 1.

### Caterpillar Staff Changes

E. W. Ryder has been named Parts Manager for the Eastern Division of Caterpillar Tractor Co., Peoria, Ill. He

replaces C. D. Byrns who resigned in order to join Arizona Machinery Co., a Caterpillar distributor.

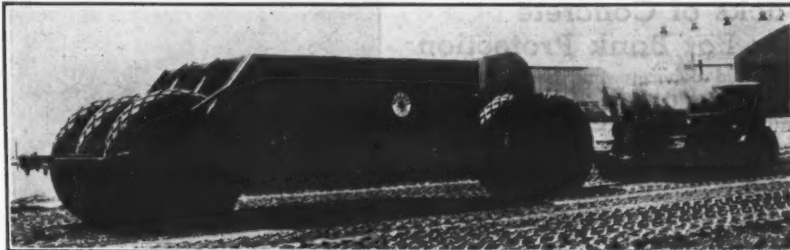
W. E. Doersam has been named Assistant Parts Manager for the Western Division. He has been with Caterpillar since 1935.

### Riggers' Wire-Rope Manual

The sixth edition of its "Riggers' Handbook" can now be obtained upon request to the Broderick & Bascom Rope Co., 4203 No. Union Blvd., St. Louis, Mo. In addition to general wire-rope information, the handbook gives instructions for making splices and calculating sling loads; it also describes the general types of yellow strand slings.

All fitting dimensions are given, as well as the working loads under which the slings may be used safely. Sockets, links, rings, and other fittings are illustrated and described.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 69.



The new Southwest compaction roller, mounted on five 36-ply Goodyear Earth-Mover tires, is shown at work on the construction of Clover Field Airport, San Francisco. Guerin Brothers, also of San Francisco, holds the contract for this work.

### Large-Size Roller Has Pneumatic Tires

A pneumatic-tire compaction roller with a gross weight of 100 tons has been introduced by the Construction Machinery Division of the Southwest Welding & Mfg. Co., Alhambra, Calif. Known as the 100-TR, it has a water-level capacity of 705 cubic feet.

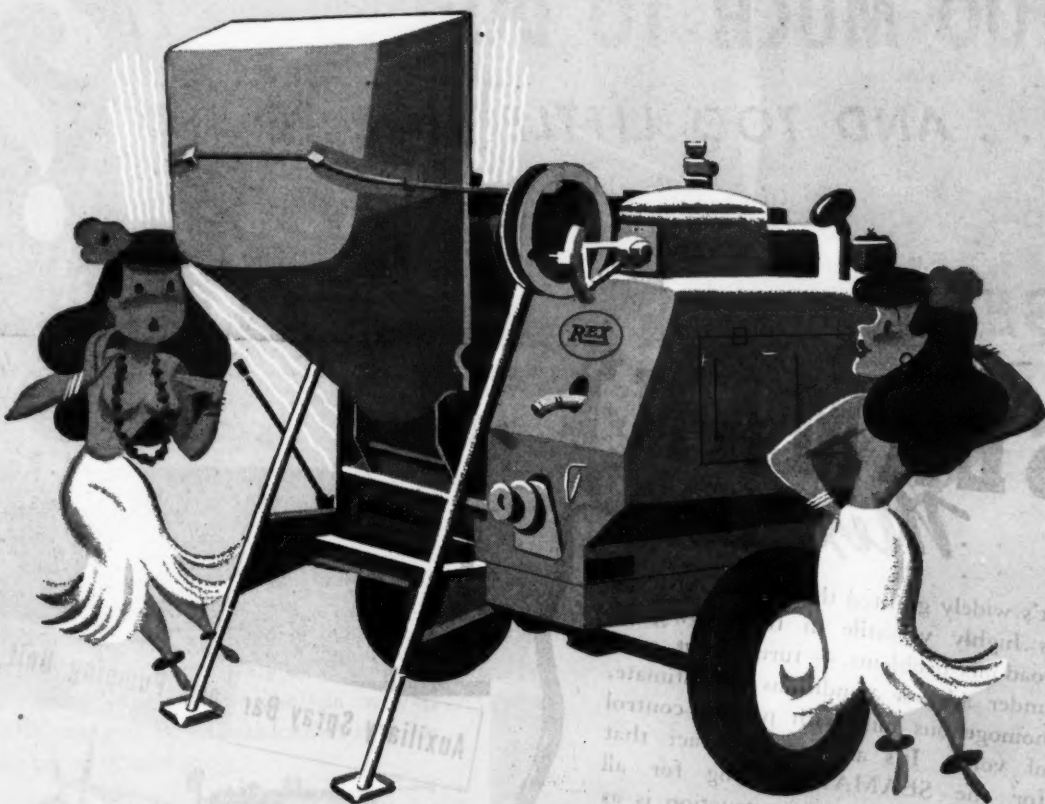
The unit is equipped with five 24.00 x 32 tires, inflated to 65-pound pressure. The wheelbase is 27 feet; overall

length, 42 feet; overall width, 10 feet; overall height, 10 feet; and the weight empty is 50,920 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 95.

### Joy Names Vice President

E. M. Platts is the new Vice President in Charge of Sales for all equipment manufactured by Joy Mfg. Co. of Pittsburgh, and its divisions.



### "Wish we could 'shimmy' like that Rex Skip"

The Rex "Shimmy Skip" is in a class by itself when it comes to getting the batch into the drum faster! You don't have to pound it to get all the batch to drop. The "Shimmy Skip" provides just the right amount of snappy, shaking action... 304 sharp impacts per minute... for a clean, quick, time-saving charge that adds up to more batches per day... more yards per job... more profit for you.

The Rex "Shimmy Skip" is actuated by wedge-shaped lugs on the drum... the heaviest part of the

mixer. As the drum rotates, these lugs engage shaker rollers on the skip, causing the "shimmying" action. There are no cams, gears, delicate adjustments, or fast wearing parts. There is no strain or extra wear on the skip... no extra burden on the transmission. Skip itself is sturdily built of heavy-gauge steel for maximum service life.

For all the facts, see your Rex Distributor or write for a copy of Bulletin No. 480. Chain Belt Company, 1666 W. Bruce St., Milwaukee 4, Wis.

### CHAIN BELT COMPANY of MILWAUKEE

#### CONSTRUCTION MACHINERY



PUMPS



PAVERS



PUMPCRETES



MOTO-MIXERS



MIXERS



THE STRONGEST GEARED POWER FOR ITS WEIGHT IN THE WORLD

Dealers in all Trade Centers

The Biggest Little Motors in the world for use where power is not practical, available, or sufficient.

2-Ton "Lightweight"	75 ft. 1/4"	
5-Ton "General Utility"	250 ft. 1/4"	
15-Ton Triple-Geared "Special"	1200 ft. 1/4"	
With patent gear change and positive internal brake that never fails, and will lock load.		
Gear Ratios	Weight	Price
2-Ton 4 & 22 to 1	60 lb.	\$ 70
5-Ton 4 & 24 to 1	110 lb.	90
15-Ton 4, 19 & 109 to 1	680 lb.	350

BEEBE BROS.

3724 4th Avenue So. Seattle 4, Washington

## Sacks of Concrete For Bank Protection

Sacked concrete has been used for bank protection on a job in Niles Canyon near Sunol, Calif. A new two-lane black-top highway is being constructed where an old river channel was located. The center of the former creek is now the top edge of the highway.

Cement and aggregate were placed dry in the sacks, and were later wet to form concrete. A total of 1,800 cubic yards was used.

Three dangerous curves and an old narrow bridge are eliminated by the new road which includes a new bridge over the Western Pacific railway and the present highway. In order to build the 2,250-foot bridge approaches, it was necessary to change the course of the Alameda Creek channel. This operation was accomplished by dragline and bucket. Approaches were constructed by tractors and bulldozers which spread 12,000 cubic yards of the old bank for



Sacked-concrete riprap protects this bank as an old river channel in Niles Canyon, Calif., is converted into a two-lane black-top road. A Caterpillar D8 tractor equipped with a bulldozer is shown here spreading fill material.

fill and 50,000 cubic yards of imported

borrow. Seven feet more of fill will be added at the top.

R. G. Clifford and Al Biasotti & Son, Stockton, Calif., contractors hold the \$427,000 contract.

## Concrete-Accessories Data

A complete line of concrete accessories is described in Catalog 400 issued by Superior Concrete Accessories, 4110 Wrightwood Ave., Chicago 39, Ill. This 52-page booklet contains information on wall-form ties and clamps, form hangers, accessories for reinforcing steel, etc. It is plastic-bound and fully illustrated.

A special insert features a table of concrete pressure per square foot of form at 50 and 70-degree temperatures, recommended safe spacings of studs and wales, and safe spacings of form ties, grouped by sizes of form lumber, and safe tie capacities.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 73.

# Stoody Manganese

## A Low Cost Electrode

*For Faster Build-ups...  
Easier Welding...*

on all manganese steel equipment

THESE TUBULAR STEEL ELECTRODES, filled with nickel and ferro-manganese particles, set a new high for weldability. Arcs are smooth and stable; low penetration minimizes heat; high build-ups cut down welding time. Rapid burnoff rate means more footage per hour. Uniformity of Stoody Manganese electrodes assures consistent weldability and all deposits possess full Hadfield properties.

- SMOOTH STABLE ARC
- RAPID BURN-OFF RATE
- LOW PENETRATION
- HIGH BUILD-UP
- LOW SPATTER LOSS
- EASY SLAG REMOVAL
- AC-DC APPLICATION

Try 50 lbs. of Stoody Manganese today; it's a smoother running, easier handling electrode. Available in 1/4" and 3/16" diameters; coated for AC-DC application, bare for DC only. Available from over 600 U.S. distributors.



**STOODY COMPANY**  
1136 W. SLAUSON AVE., WHITTIER, CALIFORNIA  
**STOODY HARD-FACING ALLOYS**  
Retard Wear • Save Repair

## CONTRACTORS AND ENGINEERS MONTHLY

470 Fourth Avenue, New York 16

Enclosed is my remittance of \$3 for the next twelve issues of CONTRACTORS AND ENGINEERS MONTHLY.

Name \_\_\_\_\_

Position \_\_\_\_\_  
(Or Type of Business)

Address \_\_\_\_\_

(City) \_\_\_\_\_  
N.B., Cash, check or postage stamps will be entirely acceptable.

# TOO MUCH TO DO ... AND TOO LITTLE TIME TO DO IT

## GET A SEAMAN Mixer

It's widely granted that the SEAMAN is highly versatile in the solving of road-mix problems, — turning out, even under adverse conditions an intimate, homogenous mix with perfect control of voids. It's an accepted fact that for the SEAMAN, mixing for all types of bituminous construction is as easy as for soil-cement, clay gravel, sand-clay or any form of soil stabilization. It's known that the SEAMAN has many other applications valuable to the road builder's work so that even apart from mixing, the SEAMAN can be kept busy day in and day out. Now add to those reasons the fact that it is lower in cost and faster in production and you'll see why time-pressed contractors turn to the SEAMAN to decrease shut-downs and increase output during every working day.

And remember, the SEAMAN, used in conjunction with certain conventional mixing plants will as much as double the daily output.

### Auxiliary Spray Bar and Pumping Unit

**For Positive Control of Moisture.** In soil cement, or any soil stabilization process and in earth work compaction, — control of the moisture increment must be positive to obtain optimum content efficiently. The SEAMAN SPRAY BAR and PUMPING UNIT, mounted on the MIXER chassis, introduces the water into the rotor chamber. Evaporation or migration losses of the water are eliminated. Further, only transfer trucks need be used for water transport. Saves equipment, saves labor, saves trips.

**More Economical for Oil.** Many of the same benefits of the SPRAY BAR and PUMP prevail in its use in oil application. With the oil introduced into the rotor chamber the binder is in process immediately and the mix is in positive control of the operator until completion.

### SOIL STABILIZATION METHODS

Going as strong as ever, the famous booklet, "Soil Stabilization Methods", compiled by Seaman Engineers, is yours on request. Handy, practical, filled with job facts and modern procedures. Ask for Bulletin—E-25.

## SEAMAN MOTORS, Inc.

MILWAUKEE 3, WISCONSIN



# Concrete Pavement Widened to 4 Lanes

**Two-Lane By-Pass Route At Edge of City Improved By Texas Firm; Asphalt Sealing Under Old Slab**

(Photo on page 1)

ONE of the very few concrete-paving jobs in Texas to be pushed through last winter was a 2.49-mile section of State Route 183, at the east of limits of Fort Worth. The \$275,000 job was done for the Texas Highway Department by Texas Bitulithic Co. of Fort Worth.

The new work widens to four lanes this important by-pass route around the north edge of Fort Worth. With the downtown traffic and parking problem becoming more complex with each passing day, traffic seems much heavier than ever on Route 183.

Texas Bitulithic Co. had 200 weather-working days from October 17, 1946, in which to finish the contract. With a steady stream of automobile traffic routed through the heart of the job, construction work was hazardous to say the least. By blocking traffic away from the paver with a motor grader, and using flagmen at both ends of the job, accidents were averted.

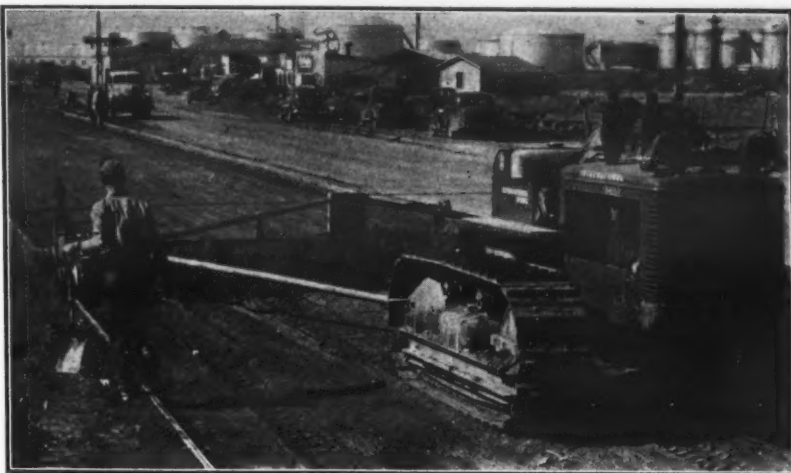
The new work put a 20-foot-wide concrete slab on each side of the existing 20-foot road, which was built in 1930. A 2-foot curb was poured on both sides after the slabs were finished, making the new road 64 feet wide overall. Except for a small amount of concrete-slab paving at the upper end of the job, the work will all be covered later with a 1-inch-thick course of hot-mix bituminous paving.

## Foundation Is Bad

The foundation under the old concrete slab is nothing more nor less than deep, fine sand. At the upper end of the job the sand changes abruptly to a deep blue gumbo, saturated with water. There it was necessary to undercut in excavating to a depth of 6 inches, and to backfill with sand from the other end of the job.

Plans called for asphalt undersealing beneath the old 33-foot-long slabs before excavating. Three 2-inch-diameter jackhammer holes were drilled at each joint on staggered centers, spacing the holes to miss the steel reinforcement. Two more holes were centered in each slab midway between the center line and the outside of pavement.

Asphalt-jacking was done by an Etnyre distributor, using a flexible hose and nozzle. OA-30 oil-asphalt was pumped in through one of the drilled holes at a temperature of 500 degrees and at a pressure of 20 psi. Pressure was held on the nozzle until the oil started coming out one of the other holes. If it did that, the hole from which asphalt oozed was plugged, and pumping continued. Pressure was held up to the point where the force of the asphalt pushed the material out the



C. & E. M. Photo

This subgrader, pulled by an International TD-18 tractor, was built in the shop of Texas Bitulithic Co. It trimmed the subgrade  $\frac{1}{4}$  inch lower than the base of the old concrete slab to allow for asphalt sealing and a blot coat.

sides of the old slab and started to crack the dirt loose on the shoulder. When that condition was reached, pumping

stopped and the hole was plugged with a wooden stopper and sledgehammer.

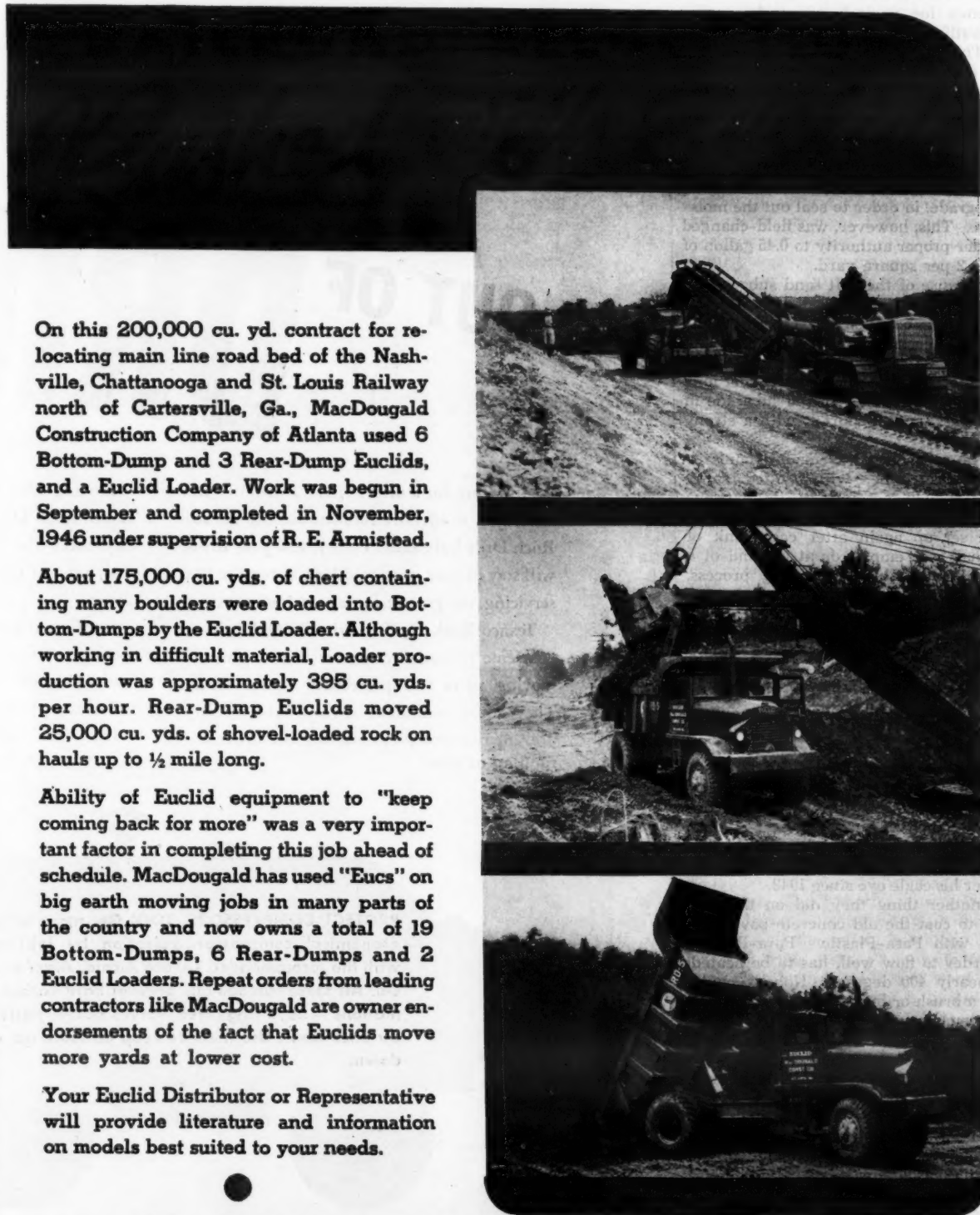
As the crew worked on up the slab,

each hole was either pumped directly, or filled by pressure from adjoining holes. One queer trait was noticed, and it appears to be general wherever asphalt or Mud-Jacking is done. When there was a "blowout" of asphalt, it invariably occurred about 4 feet outside the edge of an expansion or construction joint, where water at some time or other had cut a course.

When the slab had been asphalted underneath, two LeTourneau Model C Tournapulls moved in and dug about 13,700 cubic yards of sand and clay. As these machines exposed the base of the old slab, it became apparent why the asphalt quantity had run 2.3 gallons per square yard. Undersealing was perfect. All along the under side of the slab the asphalt layer showed up.

The low bearing factor of the soft sand adjacent to the old highway made the Tournapulls especially well suited, because their tires were wider than on standard scrapers. The machines wasted the blue clay by hauling under 500 feet,

(Continued on next page)



On this 200,000 cu. yd. contract for re-locating main line road bed of the Nashville, Chattanooga and St. Louis Railway north of Cartersville, Ga., MacDougald Construction Company of Atlanta used 6 Bottom-Dump and 3 Rear-Dump Euclids, and a Euclid Loader. Work was begun in September and completed in November, 1946 under supervision of R. E. Armistead.

About 175,000 cu. yds. of chert containing many boulders were loaded into Bottom-Dumps by the Euclid Loader. Although working in difficult material, Loader production was approximately 395 cu. yds. per hour. Rear-Dump Euclids moved 25,000 cu. yds. of shovel-loaded rock on hauls up to  $\frac{1}{2}$  mile long.

Ability of Euclid equipment to "keep coming back for more" was a very important factor in completing this job ahead of schedule. MacDougald has used "Eucs" on big earth moving jobs in many parts of the country and now owns a total of 19 Bottom-Dumps, 6 Rear-Dumps and 2 Euclid Loaders. Repeat orders from leading contractors like MacDougald are owner endorsements of the fact that Euclids move more yards at lower cost.

Your Euclid Distributor or Representative will provide literature and information on models best suited to your needs.

The EUCLID ROAD MACHINERY CO., CLEVELAND 17, OHIO



ROETH



**CONCRETE VIBRATORS**  
MOUNTED ON WHEELBARROW CHASSIS  
Write for details and prices  
ROETH VIBRATOR CO.  
1737 Faragut Ave. Chicago 40, Ill.

## Widening Contract

(Continued from preceding page)

and took up heaped loads in soft sand.

The new subgrade was dug out to the outer limits of the curb line, with a little leeway allowed for setting curb forms later on. Backfill material behind the curb line was left in a windrow within easy reach of the curb.

The finished subgrade was left as close to grade as possible, and thoroughly rolled by a Bros Wobble Wheel pneumatic-tire roller. Where sprinkling was needed, a 1,200-gallon water-tank truck hauled in water from the Fort Worth city supply, and sprinkled it on the subgrade.

A shop-made form-grader was built up, using discarded motor-grader blades for cutting edges. Towed by an International TD-18 tractor, this machine dug the subgrade to proper elevation. A cutting edge offset about an inch below the regular blade line was put on the machine to dig out the form trench for paving forms. It worked beautifully.

This machine trimmed the subgrade  $\frac{1}{4}$  inch lower than the base of the concrete slab, to allow for asphalt sealing and a blot coat called for on the plans.

### Asphalt Sealing

Specifications called for a gallon of OA-30 oil per square yard over the new subgrade, in order to seal out the moisture. This, however, was field-changed under proper authority to 0.45 gallon of MC-2 per square yard.

Because of the soft sand subgrade, a pressure distributor loaded with hot oil could not be driven between the forms. It was necessary to weld a strong A-frame on the back of the Etnyre distributor, rig up a spray bar 23 feet long to reach the outside of the subgrade in one pass, and support it with a strong chain.

The spray bar was made from a 3-inch steel pipe, with slotted spray nozzles. On account of its extreme width, the outfit had to be dismantled and set up again after each tank of asphalt was empty, or at the end of a day's run. The dismantling process, however, required only about 15 minutes of work. Lon R. Rogers, Master Mechanic on the job, worked long and hard under the guiding hand of Superintendent D. L. Barnes to finish this innovation.

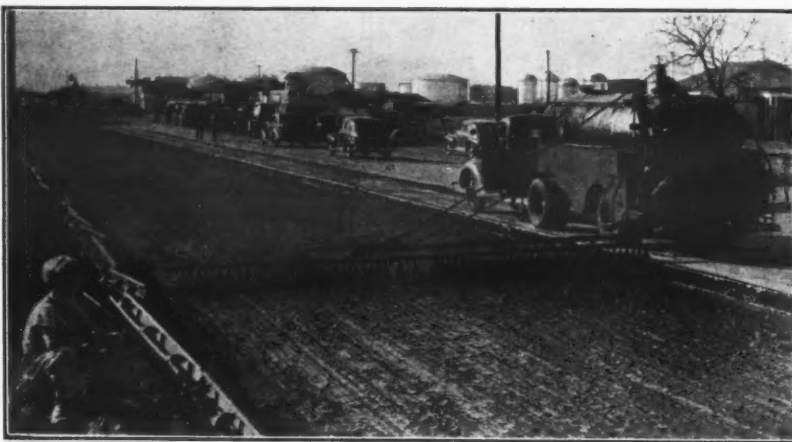
Superintendent Dick Barnes, incidentally, is one of the real old-timers of the highway paving game. The first paver he ever ran, back about 1922, had an upright steam boiler and reciprocating drive. During the war Barnes directed much of the important airfield construction in eastern Texas, and this highway job was the first road work under his eagle eye since 1942.

Another thing they did on this job was to coat the old concrete pavement side with Para-Plastic. Para-Plastic, in order to flow well, has to be heated to nearly 400 degrees. Nobody could buy a brush or broom that would stand that temperature. So grizzled, weather-beaten George McDonald, the Curing Foreman on the job, suggested cutting the stuff back with gasoline and spraying it. After a few experiments he successfully carried out his suggestion.

The Para-Plastic was heated to about 300 degrees, and 40 per cent by volume of white gasoline was put in and gently stirred. The solution was allowed to cool, and it sprayed on perfectly through a regular Hunt Process curing spray. The gasoline aerated out of the mix in about 48 hours, and the Para-Plastic then resumed its original characteristics, except perhaps that it was slightly softer.

### Concrete Forms

About 2,000 linear feet of Standard



C. & E. M. Photo

An Etnyre distributor, with a shop-made spray bar 23 feet long, shoots 0.45 gallon of MC-2 per square yard onto the subgrade of the Texas Bitulithic Co. widening job as a junior sidewalk superintendent looks on.

and Blaw-Knox forms were brought in. Dick Barnes had organized the job to keep forms set at least 1,200 feet ahead of the paver at all times. A form crew

of about six men was used to set, align, stake, and oil the steel forms.

Using the old slab for one line, the form crew set a row of steel forms 20

feet from its edge. This row centered on a longitudinal construction joint between the slab and the curb portion of the pour. A slotted keyway was built of wood, and bolted to the inside of the forms. The slot in this keyway was used to hold the  $\frac{1}{2}$ -inch deformed steel dowels 36 inches long, set on 30-inch centers. It was an ingenious arrangement.

The dowel steel came to the field bent in the center at a 90-degree angle. It was set in the slot, leaving half the steel to stick into the slab pour. When the forms were stripped, the other half of the dowel was just on the outside of the concrete face, where it could be straightened out to catch the curb pour.

In the past, Texas Bitulithic Co. has used a steel keyway for this purpose, but it was necessary to use wood on this job due to a shortage of steel. In any case, it was not necessary to burn holes in the forms, except for two small  $\frac{3}{8}$ -inch-diameter openings at each end of the 10-foot keyway.

(Continued on next page, Col. 4)

## TAKE THE "ILL" OUT OF DRILL

**S**URE cure for a drill's "ills" — drill doctors say — is *effective lubrication*. Use Texaco Rock Drill Lubricants (E.P.), and your drills will stay in peak condition longer, require less servicing, cut greater footage at lower cost.

Texaco Rock Drill Lubricants (E.P.) have "extreme pressure" characteristics — give all moving parts full protection against wear. They resist oxidation, always flow readily, prevent rust and corrosion whether drills are running or idle.

Leading rock drill manufacturers approve Texaco Rock Drill Lubricants (E.P.) because they meet the lubrication requirements of every type of drill design and operating condition.

For Texaco Products and Lubrication Engineering Service, call the nearest of the more than 2500 Texaco distributing plants in the 48 States or write:

The Texas Company, 135 East 42nd Street, New York 17, New York.



PROTECT COMPRESSORS, TOO! Get more efficient, economical compressor operation by lubricating with the recommended Texaco Alcad, Algol or Ursa Oil. All these famous oils prevent hard carbon formations — keep rings free, valves active, ports and air lines clear. Use them to keep pressure up, costs down.

Tune in . . .  
TEXACO STAR THEATRE  
presents the  
TONY MARTIN SHOW  
every Sunday night.  
See newspaper for  
time and station.



# TEXACO



## Use of 2-Way Radio To Supervise Work

The use of two-way radio by contractors and engineers is growing in importance both on large construction projects and in the supervision and direction of highway maintenance.

With it, users can keep in contact with all sections of large construction projects, be in communication with maintenance gangs in the field, locate breakdowns quickly and send trouble shooters to the scene, and speed up snow removal by directing the equipment from a single headquarters.

One manufacturer of this type of equipment is Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Ill., which makes FM 2-way equipment. The company maintains a staff of 36 factory-trained field communication engineers who specialize in this type of work. They will survey the requirements of any state or county highway department, contractor, engineer, or others and then recommend what they



C. & E. M. Photo

Paving Inspector A. E. Kidd, Field Engineer Jack Green, Superintendent D. L. Barnes, and Senior Resident Engineer J. P. Cooper on the Texas Bitulithic Co. job.

consider to be the equipment necessary. They will supervise its installation, assist the customer in filing his application with the Federal Communications Commission, and instruct the customer's personnel in its operation.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 99.

## New Jahn Office, Chicago

The opening of a new sales and executive office has been announced by the C. R. Jahn Co., maker of heavy-duty low-bed trailers. The office is located at 1106 W. 35th St., Chicago, Ill. Factory and accounting offices will remain at Savanna, Ill.

## Widening Contract

(Continued from preceding page)

### Expansion Joints

Expansion joints in the new concrete work match the old slab, which had a joint every 99 feet. They were made of gumwood, supplied by the Lofland Co. of Dallas in strips 5 inches x 10 feet x 3/4 inch wide. The top of this joint was set an inch low in relation to the top of the slab. Two of these joint sections were set to reach across the pour, and six Star Lugs in each section took the place of the usual dowel bars placed there. The expansion joint was staked to the subgrade by steel pins.

A 1-inch longitudinal formed joint 2 inches deep was made where the new concrete joins the old pavement. This gap, and the opening above the expansion joint, were filled later with hot Para-Plastic solution.

There is no weakened-plane joint in the center of the pour. But at the upper end of the project where some finished concrete slab will be placed, this joint was put in. One of the most unusual devices to appear on Texas highways in recent years did this work. It is called the Kies membrane cut and coated groove.

It was developed by Contractor George Kies of Austin, Texas, while he was engaged in highway paving. He noticed that wherever a dummy-contraction-joint crew made a mistake, and then moved on ahead to the right location, a crack would invariably appear in the pavement, no matter if the place was puddled. So he asked for permission to attach a steel knife to his float-finishing machine, just underneath the screed longitudinally with the slab. State engineers admit that they were amused at the time, but they granted Mr. Kies his wish.

The thing worked like magic. The steel knife, or bar, cut a slot just underneath the screed. At the tail end of this bar, Kies fixed up a little pump that would feed a few drops of Hunt Process curing solution into the V-slot. Normal finishing closed the surface over, but the hairline plane-of-weakness crack was perfectly formed. It has been used now on about eight Texas Highway Department jobs, and was used on a part of this one.

### Batch Plant

Gravel was supplied to the Texas Bitulithic batch plant by Fort Worth Sand & Gravel Co., and the sand came from a commercial plant operated by Jefferies & Betts. It was hauled in by truck, dumped in stockpiles near the plant, and served up to the bins by a Northwest 1 1/2-yard machine with its clamshell on a 55-foot boom.

A Heltzel batching plant with two 30-ton bins was used to batch aggregate and sand. The material was weighed on dial scales, dumped to a batch hopper, and the whole batch dumped into the truck beds. Aggregate from 1 1/2 inches down went in first, sand was weighed next, and the batch dumped to a truck.

From 18 to 20 Fords and Chevrolets, each machine hauling two 40.8-cubic-foot batches, were used. After the trucks got their aggregate, they backed in to a Blaw-Knox bulk-cement plant, with 275-barrel storage capacity, and took on the proper amount of Trinity portland cement. The loads were covered by tarpaulins for the 7-mile haul out of the job. Batch trucks were rented from private owners on a batch-payment basis.

Bulk cement was shipped to the plant in boxcars, and unloaded by a Fuller-Kinyon cement unloader. A Blaw-Knox screw feeder took cement up to the storage bin.

The Class A concrete for this job was

(Concluded on next page)



# Rock Drill Lubricants (E.P.)



## Widening Contract

(Continued from preceding page)

designed on a water-cement ratio of 6 gallons per sack, with 5 sacks of cement to the cubic yard. Batch weights for a 40.8-cubic-foot mix were as follows:

1½-inch aggregate	3,094 lbs.
Sand	1,977 lbs.
Cement	710 lbs.

One of the very rigid rules followed by the Texas State Highway Department is the close control of concrete so far as weights, water content, and batch yield are concerned. Concrete yield is not only controlled to a tolerance of 1 per cent, but checked at every expansion joint to make certain nothing is haywire. Concrete test beams are made each shift, and cores are cut from finished pavement. Unless yield, pavement thickness, and strength come up to designed requirements, certain letters of explanation are called for. Writing them can cause more headaches than doing the job right initially in the field, according to Field Engineer Jack Green.

### Mixing Concrete

Texas Bitulithic Co. used a Multi-Foote 34-E single-drum paver, with a 30-foot boom. The only way to handle a pour was to spot this machine along the edge of the old concrete slab, and try to protect it from heavy automobile traffic by flagmen. A spare motor grader was set across the pavement behind the paver the day CONTRACTORS AND ENGINEERS MONTHLY was represented on the job.

Batch trucks approached the paver from behind, cut in to the side of the old slab on which it was set, and backed in to discharge their batches to its skip. A weighted beater was used by the paver operator to dislodge cement and other fine material in the batches from the skip bottom.

Mixing water was hauled by the sprinkler tank truck, and transferred by its pump to a 2,000-gallon water tank which was dragged along by the paver. The only line or hose connection necessary for this set-up was a length of about 40 feet of steel-reinforced rubber hose. The water was put into the batch by the pump on the paver.

The concrete was mixed 50 seconds to a slump of about 2¼ inches, and dumped outward from the paver by the dual-gate bucket. With the exception of a general working over and consolidation by a Jaeger-Lakewood finisher, no vibration was done. The machines moved ahead at a rate of about 110 feet an hour.

### Finishing and Curing

The initial knockdown and consolidation of the slab was done by the Jaeger-Lakewood finisher, followed closely by a Koehring Longitudinal Finisher. Using a single screed, this finisher swept the concrete surface very close to grade. Excess mortar dislodged by this machine dropped off on the base of forms, where it was shoveled away by the two puddlers who worked with the finisher.

Finishers with long-handled wooden bullfloats then smoothed up the surface, and followed that dressing with long-handled Heltzel steel floats which checked the surface to near-perfect tolerances. The edges and joints were dressed with ½-inch-radius edgers. A final finish was put on with an 8-inch heavy canvas belt, giving a modified herringbone design.

Concrete was cured for at least 3 days with rolls of strong paper, 20 feet wide, unrolled by means of 2 x 4's through the center. The paper was weighted with sand along the edges, and in the

center when necessary.

Steel forms were picked up the day after the pour, hauled ahead by a flat-rack truck, and placed by hand. The form pins were pulled by a lever-type puller, and laborers with hoes cleaned the stripped forms. Oiling was done by a Hunt Process spray gun.

All the men on the job had to be constantly on the alert for fast-moving automobile traffic, despite the flagmen who were present. Completion of this new section of wide 10-inch-crowned boulevard will help a great deal to eliminate a two-lane bottleneck. Through traffic will be speeded up. Fort Worth's traffic problem, however, very much resembles that of most of the nation's other great cities, and the solution to it may take years of thoughtful building.

### Personnel

The job was conducted with Federal-Aid funds, and known as F 634 (11). It was designed and supervised under the general direction of State Highway

Engineer D. C. Greer, with Jed Robinson as Construction Engineer. G. M. Garrett was the District Engineer at Fort Worth, J. P. Cooper was Senior Resident Engineer, and Jack Green was Field Engineer.

For Texas Bitulithic Co., in addition to Superintendent Barnes, S. A. McCallum was Subgrade Foreman, Frank Kirkpatrick was in charge of excavation, and Howard Black was in charge of mixing.

### Boiler Line Redesigned

A catalog describing its line of Square-Heat Type R boilers can be obtained from the Kewanee Boiler Corp., Q Road, Kewanee, Ill. This line is said to be a streamlined version of the previous Square Type R models.

Catalog 88-4 describes the complete 3R line and gives all specifications for oil, gas, stoker, or hand-fired coal units.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 81.

# Barber-Greene

## The Ditcher that Conquered CORAL ROCK!

Tough abrasive coral rock wasn't considered a good spot for a mechanical ditcher until the B-G Vertical Boom Ditcher first showed how the job could be done. Since that time, miles of trench have been cut in coral rock by B-G Ditchers, from the Florida flat lands to the Pacific's war-won islands. Naturally, with that kind of ability it is the preferred, moderate width, medium depth ditcher for working in everything from cemented gravel to sticky gumbo.

Like all B-G machines, it is engineered by experts

to give long-time, cost-reducing service: the self-cleaning "kick-out" digging buckets on the vertical boom operate like a milling machine for sure cutting action: the automatic overload release gives positive protection, automatically resets itself: its short length, low over-all height and sure-footed crawlers give it maximum maneuverability. These are unique features that recommend this B-G Ditcher for tough going. Barber-Greene Company, Aurora, Illinois.



There's no other like it! No other ditcher can equal the efficient "milling action" of the B-G "vertical boom" Ditcher.

PUMPS 7500 GALLONS PER HOUR

WEIGHS ONLY 53 POUNDS

DEPCO's self-priming gasoline powered pump is built to give high capacity where accessibility is difficult.

PROMPT DELIVERY  
Write for information



DIESEL PUMP AND ELECTRIC MFG. CO.



BARBER-GREENE COMPANY • AURORA, ILLINOIS

Constant Flow Equipment



LOADERS

PERMANENT CONVEYORS

PORTABLE CONVEYORS

COAL MACHINES

BITUMINOUS PLANTS

FINISHERS

DITCHERS





Here a Harbormaster-equipped lighter delivers oil drums and other supplies from ship to shore at Goodnews Bay, Alaska.

## Outboard Propulsion For Unloader Barges

With the passing of time and the lifting of military secrecy, more and more stories are coming to light of the accomplishments of our armed forces. This one concerns polar industrial expansion at Point Barrow, Alaska, begun by the Navy's Seabees and now being finished by civilian contractors.

One of the toughest phases of this job is the transporting and unloading of men, heavy construction and drilling equipment, and supplies. When freighters arrive annually to supplement air tonnage flown in to the base, it is important that operations proceed with all celerity. For a polar ice pack may close in without warning and seal off the area. Every item must be lightered from the freighters at deep-water anchorage, rushed to the beach, and unloaded immediately.

Lightering equipment consists primarily of a series of steel-welded pontoons with outboard propulsion units made by Murray & Tregurtha, 72 Hancock St., Quincy 71, Mass. Known as Harbormasters, they are both gas and diesel-powered and range in size from 20 to 300 hp. The Models O-2D in use at Point Barrow are 115-hp units.

Steering is accomplished by the thrust of the propeller, which can be turned to any direction throughout a 360-degree arc. The Harbormaster is equipped with a 180-degree elevating mechanism which lifts the submerged assembly out and up. This feature is of advantage in shallow water and allows operators at Point Barrow to push the pontoon lighters up to the beach without fear of striking bottom. A pin which shears automatically when an underwater obstruction is met prevents damage to the underwater portion of the unit.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 39.

## Shot-Peened Axles Used on Truck Line

A modern adaptation of the ancient practice of cold-working metal by hand-hammering has been applied to truck axles by the Dodge Division of the Chrysler Corp., Detroit 31, Mich. It is said that the process, known as shot-peening, will more than double the fatigue life of axle shafts. It is being applied to the rear-axle shafts of the 175 basic chassis models of Dodge Job-Rated trucks.

In the process of shot-peening, axle shafts are bombarded with thousands of small steel shot, directed with terrific force. Each shot makes a slight indentation in the surface of the metal when it strikes; this causes a slight but permanent stretching of the metal, both on the surface and also to a slight depth below it. This acts to strengthen the surface zone of metal by changing the shape and orientation of the grains of the metal so as to resist fracture more effectively.

Shot-peening is said to remove scale caused by forging and heat treatment and thereby increase the resistance of the surface to cracks. By increasing

surface hardness the resistance to wear is also increased.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 18.

## Soil-Working Equipment

Literature describing its soil-manipulating equipment is put out by The Dunham Co., Berea, Ohio. Separate bulletins are printed for each of the following products: Culti-Packer, Culti-Harrow, Culti-Treader, Culti-Hoe, and Culti-Mulcher.

The Culti-Packer, applicable to roadside development work, is designed for packing behind a disk, spring harrow, or drill. The sprocket pulverizer can be run forward or backward by reversing the pole. Forward, it is used for pulverizing, crushing, and firming; backward, for mulching and cultivating. It is claimed that the zig-zag teeth of the patented sprocket wheel give extra width as they weave through the soil to work and rework it.

The bulletins describe the equipment

pieces and list all sizes in which they are made. Also listed are several supplementary uses of the equipment.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 66.

## Keystone Staff Changes

Changes in its staff organization have been announced by the Keystone Asphalt Products Co., a division of the American-Marietta Co., Chicago, Ill. James E. Poole has been named Sales Manager for the Paving Products Division. Bryant W. Pocock has been named Research Director. William C. Allen of Dallas and Merle L. Cripe of Chicago will serve the airport, highway, and building-material users throughout the east, middle west, and southwest.

# PROFIT TIP

... for Tractor-Scraper Buyers!

**Use whatever tractors you like but be sure you get LaPLANT-CHOATE Scrapers — for best results under the most conditions.**



When it comes to buying tractor-scraper rigs, remember it's the scraper that controls the "payload." And as every experienced dirtmover knows, there's a big difference in the performance of various scrapers under varying job conditions. Moreover, a difference of only 5 yards per hour, figured over the operating life of a scraper, can easily mean 60,000 yards of "pay dirt"—gained or lost—at your own bid price!

That's why you'll find more and more smart dirt-movers buying their scrapers *entirely independent of the tractor* and holding out for job-proved LaPlant-Choate "Carrimors." Why LPC? Because operating records on hundreds of jobs prove conclusively that LaPlant-Choate rigs deliver *highest average production at lowest overall cost*. For one

thing, they get bigger loads faster and easier in *all kinds of materials*. They also gain time traveling to and from the fill because they're free of costly dead weight. And when it comes to spreading—man, there isn't a scraper on the market that can match LaPlant-Choate *positive forced ejection* for cleaning the bowl in a hurry because *the apron moves ahead with the load*—no chance of jamming sticky or bulky material between the ejector and apron.

But that's only part of this interesting profit story. For complete facts call or write your nearest LaPlant-Choate dealer today. See him also for dependable repair parts and prompt, efficient service on your present LPC rigs. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa; 1022 77th Ave., Oakland 3, Calif.

# LaPLANT CHOATE

Positive

FORCED EJECTION SCRAPERS

FIRST in Value because they're FIRST in Performance!



## Asphalt Underseal

(Continued from page 1)

sub-base and pavement surface for the improvement.

A longitudinal joint runs along the center line of the pavement. All the necessary drilling was done along half the road width before any undersealing was attempted. Where a slab was not cracked or broken, one hole was drilled directly in the center of the slab—that is, 25 feet from each expansion joint and 4½ feet in from the edge. Two other holes were drilled on each side of the expansion joint, 3 feet back from the joint and 3 feet apart on centers, or 1½ feet on each side of the center line of the 9-foot-wide slab. Where the slab was broken up, additional holes were added around the cracks as were deemed necessary to fill up the voids that apparently existed in the sub-base beneath the pavement.

Drilling of the 1¼-inch-diameter holes was done by an Ingersoll-Rand Jackhammer powered by a Le Roi 105-cfm portable air compressor. From 20 to 25 holes were drilled with one Timken bit. Two-foot lengths of steel were used in the drills. A 7-man crew was employed in the drilling operations, including a foreman, two drill operators, a compressor operator, a driver for the International 5-ton truck which towed the compressor, and two flagmen. The flagmen set up barriers on both sides of the work crew and maintained traffic along the other half of the road. They moved their barrier ahead as the drilling progressed.

### Asphalt Undersealing

After the holes were all drilled and when a load of asphalt was on its way to the job, the drill crew went back over its work and blew out each hole. This was done with a hose from the compressor, at the end of which a pipe was attached for inserting into the hole. In this way the holes were thoroughly cleaned before any bitumen was admitted.

Asphalt with a penetration of 15 at 32 degrees F was purchased from the Pan American Petroleum & Transport Co. It was shipped in tank cars from the refinery at Destrehan, La., just above New Orleans, to a siding of the Texas & Pacific railway at Lecompte. When

the 10,000-gallon tank car arrived, a Grace Rapid Fire kerosene-burning heater with pump was connected to it and was not removed until the contents were emptied. When the desired temperature, from 400 to 440 degrees F, was attained, the asphalt was pumped from the car to a Littleford 1,080-gallon distributor mounted on an International K11 truck. The Rapid Fire unit effected the transfer.

After a 3-mile average haul to the job, the asphalt was pumped into the holes by the distributor manned by a crew of eight. This included the foreman, the two flagmen again, the driver of the distributor, one man to insert the nozzle of the hose into the hole and another to control the supply valve, one man to plug the holes, and the last to clean the surplus asphalt from the pavement.

As each hole was filled with asphalt, a wooden plug about 3 feet long and in cross section just large enough to fill the opening was driven into the hole and allowed to remain for several minutes. This prevented the asphalt from flowing out over the pavement. Excess asphalt was also immediately removed from the top of the slabs, which previously had been wet to prevent the asphalt from sticking. A 500-gallon tank, mounted on an International ¾-ton truck, furnished the water which was obtained from fire hydrants in Lecompte.

The asphalt undersealing raised the slabs anywhere from ½ to 1 inch according to the lift required to make their surfaces level. Then too, the entire sub-base was sealed, checking any tendency for water to get under the concrete. All surface cracks were also poured with the hot asphalt.

The amount of asphalt used varies widely according to the condition of the highway. On the 6-mile job in the vicinity of Lecompte, three 10,000-gallon tank cars were used, or an average of 5,000 gallons per mile of full-width pavement. In a 9-hour day about 4,000 gallons of asphalt was consumed in the undersealing treatment.

When half the pavement was completed, the same process was repeated on the other side. Similar maintenance work was also done on U. S. 71 around Bunkie, 16 miles south of Lecompte.

### Personnel

The field operations were supervised by Mat A. Arrington, Foreman of the

maintenance crew. E. J. James is District Engineer of the Third District with headquarters at Alexandria. The Louisiana Department of Highways is headed by P. A. Frye, Director, with N. E. Lant, Chief Engineer, and R. B. Richardson, Construction and Maintenance Engineer.

Accidents don't just happen. Think safety and work safely on your job.

### Branch Changes for I-H

Changes in its branch management have been announced by the International Harvester Co. F. E. Reishus, formerly Manager at Sioux Falls, S. Dak., has been transferred to Lincoln, Nebr., to succeed J. L. Henn, retired.

E. R. Zimmerman, formerly Assistant Manager at Sioux Falls, has been promoted to Branch Manager there.



NOT THIS.



BUT This!

with Silver STEERING BOOSTER

Fingertip pull on clutch steering levers opens clutches FULL TRAVEL. Ends frequent repairs to clutches, throwout bearings and brakes. Skinners do more and better work because angle-dozing, following contours and steering big crawler tractors does not mean sore muscles and exhaustion at the end of the day. For all crawler tractors. Installed on approval by your dealer.

Silver BOOSTER MANUFACTURING CO.  
1406 SOUTH GRAND AVENUE  
LOS ANGELES 15, CALIFORNIA  
Richmond 6191



STOPS MOISTURE FROM FALLING INTO TRACTOR EXHAUST... Just slip the "RAINCAP" over the open end of your tractor exhaust, and you eliminate forever the danger of moisture falling into the exhaust, injuring your tractor.

THE CAP THAT DOES NOT FORGET TO CLOSE... Completely automatic—the "RAINCAP" is counter-balanced to open when the tractor starts and close when it stops. Rust proof—made of cast aluminum—can be installed in two minutes. F.O.B. Waterloo, Iowa.

Immediate delivery  
Liberal dealer discount

No.	O.D. Exhaust	Price
1	2 1/8"	\$1.90
2	2 3/8"	1.90
3	2 3/4"	1.90
5	1 7/8"	1.90
55	2"	1.90
6	1 1/2"	1.90
7	2 1/2"	1.90
8	3"	2.50
9	3 3/8"	2.50
10	3 1/4"	2.50
11	3 1/2"	2.75
12	4"	3.00



WATERLOO FOUNDRY CO., WATERLOO, IOWA

TO ALL CONSTRUCTION SUPPLIES.

**For Bigger Payload Performance**

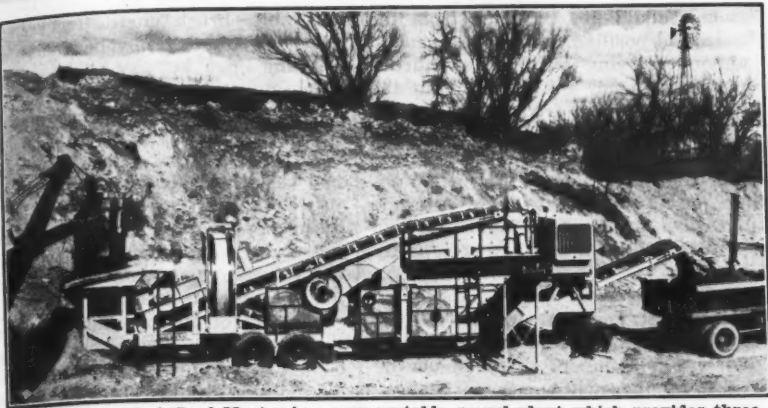
...the logical first choice is HAISS HI-POWER. Unique for Sta-in-line reeving, out-of-the-muck sheaving. Weight placed for highest digging power, with closing ratios up to 7:1. Write for facts.

**HAISS HI-POWER**

Distributors in all large cities

GEORGE HAISS MFG. CO., INC., Canal Place & E. 142 Street, New York 51, N. Y.





The Universal TwinDual Master is a new portable gravel plant which provides three stages of crushing in a single unit. It features the TwinDual roll crusher, a two-stage secondary crusher in one machine.

### Gravel Plant Features Special Roll Crusher

A portable gravel plant which provides for three stages of crushing in a single unit is announced by the Universal Engineering Corp., 620 C Ave., W., Cedar Rapids, Iowa. This plant features the TwinDual roll crusher, a patented two-stage secondary crusher in one machine.

The primary crusher is a 10 x 24-inch roller-bearing jaw crusher. The secondary is a 24-inch roller-bearing star-gear TwinDual roll crusher. It consists of two sets of different-diameter rolls mounted on common roll shafts and operating simultaneously. Half its crushing capacity is devoted to the first secondary crushing, and the other to the second or finishing stage. It is said that this two-stage secondary reduction permits the jaw crusher to operate with up to 100 per cent wider discharge opening.

The plant uses a 3 x 10-foot 3½-deck roller-bearing gyrating screen mounted on an incline. Conveyors are 30 inches wide. They are equipped with anti-friction bearings. Troughing rolls are equipped with sealed-for-life bearings. Overall length is reduced by the use of a Rotovator revolving elevator, which also eliminates a return conveyor system.

The charging hopper is equipped with a built-in reciprocating feeder and trap grate. A swivel feed attachment is offered, and a 3 x 6-foot 2-deck chip screen can be mounted inside the elevating Rotovator without any changes in the basic plant.

The gooseneck trailer is equipped with 12 pneumatic tires with equalizers on the rear wheels. Air brakes are standard equipment. Without power the TwinDual Master weighs 47,820 pounds. Moving and operating height is 12 feet 6 inches; overall length is 46 feet; and width is 8 feet.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 21.

### Safety Hose Guards Air-Tool Operators

A safety aid for air-tool operators who may strike high-tension electric wires while digging into the earth has been developed. It is a safety rubber hose made by the Mercer Rubber Co., 450 Barton St., Hamilton Square, N. J. Construction of the new hose is based on the principle that electricity will follow the line of least resistance. The hose has a resistance of 0.06 ohms in 100 feet compared to a resistance in the human body of from 200 to 1,000 ohms.

The safety air hose has a braided copper ribbon of 832 strands which forms a high-current-carrying medium securely bonded in the carcass of the oil-proof, abrasion-resistant, and heat-resistant hose. When used with portable compressors, adequate grounding must be provided.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 46.

### Small Concrete Mixer

A 3½-cubic-foot portable concrete mixer is made by the Essick Mfg. Co., 1950 Santa Fe Ave., Los Angeles 21, Calif. It has a trailer type of mounting, and can be moved by one man or hitched to a vehicle for transporting over long distances. It has two rubber-tired wheels with 16-inch outside diameters.

The Model 350 is powered by a 1 to 1½-hp air-cooled engine; the Model 350-E is powered by a ½-hp single-phase electric motor; and the Model 350-L has no power unit, but comes with a V-belt and pulleys.

The drum has a 26-inch diameter, and a 26-inch depth. It features Hi-Speed dual mixing action, and has two

long spiral-duplex ribbon blades and two shovel-type blades. Automatic multiple stops are said to give selective mixing angle on either side. The unit will also charge or dump on either side. Drive shaft and drum revolve on four sets of sealed ball bearings lubricated for life.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 19.

### Atkins Engineer Dies

Long associated with the saw industry, John Alonzo (Ollie) St. Clair recently passed away at the age of 64. At the time of his death, he had been with E. C. Atkins & Co., saw manufacturer of Indianapolis, for 46 years.

# GOT A YEN FOR Yardage?

If you want a big producer in the ¾ yd. class, the Lorain 41 is your baby

**ONTARIO, CANADA**  
200 yds. in 10 hrs.

**ILLINOIS**  
1000 yds.  
in 8 hours

**MONTANA**  
135 yds. per hour

**TEXAS**  
1200 yds.  
in 11 hours

**T**HERE you are! Actual yardage records made in all types of digging, under different conditions and from widely separated sections of the continent. It's the kind of proof that makes sense to profit-minded contractors. If yardage is your yardstick of value, call or write your local Thew-Lorain distributor now. He can show you Lorain-41's right in your own area with equally impressive performance records.

**THE THEW SHOVEL COMPANY**  
Lorain, Ohio

*Thew*  
**Lorain 41**



# Alert Your Workers To Safety Taboos

**Teach Them to Avoid These Dangerous Practices When Handling Heavy Equipment; Consider Fatigue Too**

† SAFETY in the use of heavy-duty construction equipment is not a goal achieved simply by giving and receiving orders. R. A. Beckwith, Vice President and Chief Engineer of the Koehring Co. of Milwaukee, Wis., pointed this out in his remarks before the Construction Section of the National Safety Congress held in Chicago last October.

The employee must be made continually conscious, through training, suggestions, and leadership, of the tremendous importance of safe conduct while working around heavy contracting equipment. This cannot be accomplished by dictating and issuing orders or by an iron-clad written safety-instruction sheet. It must be accomplished through effective leadership.

In approaching the development of a safety-minded organization, management must play the first card. The chief executives must be thoroughly in accord with a safety program developed and inaugurated by management. For they can pass this program on to their workers only if they are definitely in agreement with the safe practices so laid down. Such a program might be developed around an awareness of fatigue as an accident factor, and a number of basic machine-handling practices.

## Fatigue as an Accident Factor

Many accidents are attributable to fatigue. Many operations where great physical exertion is involved, and especially those where lack of alertness might injure the subject himself or his co-workers, should be studied by major executives. We all know that there is a definite relationship between accurate operating judgement and the mental and physical fatigue of an individual.

## Dangerous Practices to Avoid

The following cover some of the common dangerous practices or situations:

1. *High working booms on rubber-mounted cranes.* Rubber-mounted cranes should never travel over rough sections with a boom above 60 degrees, especially when a pendant is used. The swing of the pendant and the rebound of the tires is sufficient to throw the boom over backwards.

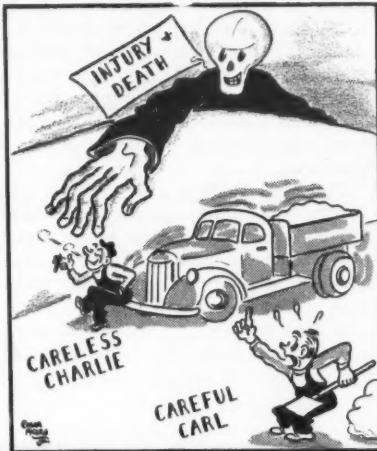
2. *Lifting heavy loads on rubber-mounted equipment without outriggers.* Most rubber-mounted cranes can lift the full capacity of the crane over the ends parallel to the wheelbase without outriggers. But doing so results in heavy deflection on the tires. If the load is dropped, the heavy inflated tires will give a dangerous rebound, tending to throw the boom over backwards. Therefore such loads should be lifted on the outriggers.

3. *Vertical boom not returning.* When an operator has raised the boom too high and it will not return by its own gravity, he should do nothing to bring it down before a planned procedure is inaugurated.

He should immediately warn anyone in the rear of the crane to vacate the space. Then he should attach his hoist line to some rigid or stationary anchor, perhaps a truck with brakes set, or the trunk of a large tree. If the boom is attached to a truck, the truck can pull the boom forward with the operator at the controls.

Still another remedy is to place some obstruction behind the rear crawler and slowly back the machine up onto this low obstruction. This will throw the

## HIS FIRST CHOICE!



boom center of gravity forward. *Never try to lower a boom by jerking or jiggling.*

4. *Lifting long booms.* Extra-long

booms should not be lifted from the horizontal position or from the ground without referring to the manufacturer's specifications for the length limit the boom can be lifted from the horizontal position using a low A-frame. The loading on the structural members is greater in a long boom when lifting it from a horizontal position with a low A-frame than when handling the maximum load as represented in the lifting-capacity charts.

5. *Equipment set in motion.* A truck or crane that has been standing idle for any length of time on jobs where workmen are in numbers should never be put in motion without some pre-arranged signal, or a very slight movement preceding the normal moving cycle.

Men working around such equipment who receive the slightest shock or vibration will clear the machine immediately if they are working in a tight position. Signal bells or horns have proved ineffective when they must be used frequently. In such instances, warning contact arrangements are more

desirable—brush guards for example. Guarded rotating members, fans, and rotating open keyway shafts are also important items.

6. *Authority for safety operating orders.* Many serious accidents could have been avoided if an equipment operator had acknowledged the signal of approaching danger from someone not in authority—a workman who saw it coming, for example. But most operators are reluctant to take orders from any man below them in authority.

Orders from anyone should be effective around moving machinery when danger is imminent. And this universal eligibility to give orders should be made clear through management's educational program.

7. *Crane swinging on a flatcar.* No crane or shovel should complete a full swing while it is mounted on a flatcar, unless the flatcar has been blocked beyond the outside of the rails. The machine should then be rotated at reduced speed.

(Continued on next page, Col. 4)





## Tamping-Roller Line Offers Three Styles

A line of tamping rollers in three major styles is made by the F. W. McCoy Co., Denver, Colo. All are available as trailer sections or 3-drum units. The largest of these is the Model USBR-2; when loaded with water and sand it gives a bearing pressure of 1,600 psi. It consists of two drums of 60-inch diameter with 120 feet on each drum. Weight of the unit when empty is 30,690 pounds; tamping area for each foot is 7.06 square inches; and the length of each foot is 8 1/4 inches.

Model USHD-2 weighs 15,000 pounds empty and exerts a pressure of 1,308 psi when loaded with water and sand and using a 6-square-inch foot. A 7-square-inch foot is available which gives a bearing pressure of 1,120 psi under the same conditions. Each of the two drums is 60 inches in diameter, 60 inches long, and each has 120 feet. The feet are 8 1/4 inches long.

Model SHD-2 is patterned after Mod-

el USHD-2 but is smaller in size and weight. Diameter of the drums is 40 inches, length 48 inches, and total empty weight is 7,250 pounds. Feet of either 6 or 7-square-inch tamping areas are available. Bearing pressure with the 6-inch foot and the roller loaded with water and sand is 595 psi.

Features of all three models include heavy-duty construction to withstand rugged service, cleaning combs adjustable to compensate for wear, and easily removed feet.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 40.

## Can Winter Be Far Behind?

During these balmy summer days, it is well to look ahead and prepare to meet this winter's snow problems. As an aid to preparedness, a 36-page catalog on its snow plows has been issued by the Wausau Iron Works, Kramer St., Wausau, Wis.

The Wausau line includes one-way-

blade plows, reversible-blade plows, V-type plows, V-type with plow-mounted wings, front-frame-mounted wings, grader plows, wheel-tractor plows, and others. In addition to giving specification for each of these, the catalog lists the general construction features of the entire line.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 65.

## West-Coast Engineer Dies

Edward C. "Ted" Pantan, heavy-construction Manager of the Bechtel Corp. and a leading construction man in the west, died recently at his home in Del Mesa, Calif. He was 58 years of age.

Pantan had been in the construction business for 30 years, and at the time of his death was in charge of construction of the Friant aqueduct of the Central Valley Water Project. He was also in charge of right-of-way maintenance for the Western Pacific RR.

## Alert Your Workers To Safety Taboos

(Continued from preceding page)

8. *High-tension wires.* When a boom or cable touches a high-tension wire, creating a short, the operator should either stay in his position on the machine and bring the boom back, or jump clear of the machine. He should never dismount by climbing down the side, permitting his body to come in contact with the machine and the ground at the same time. He should also warn all ground crews to refrain from any physical contact with units touching the wire.

9. *Maintenance work on machines with power units in operation.* There are very few pieces of equipment on which maintenance work should be done while the motor is running. An idling motor has more vibration than one under load. This vibration can partially throw in clutches, release safety pawls or, perhaps, encourage the release of back locking toggle clutches that may be supporting a load or holding part of the equipment in position.

10. *Idle motor or moving machinery on standing equipment.* No piece of equipment mounted on wheels or crawlers should be left running on inclined surfaces in the absence of the operator. For all such equipment may start moving if it stands on loose material. The operator should never leave his station with pay load or attachments of any kind off the ground except the base boom.

11. *Inexperienced operators.* Inexperienced operators, or new operators on equipment with which they are not thoroughly familiar, should never be allowed to take over a full shift or a day's run without passing through a partial day's work under the direct and close supervision of an experienced operator. Many accidents have occurred with equipment in the hands of new men who were uninstructed and had become fatigued.

12. *"Grandstanders" and "smart guys".* In all construction work where heavy equipment is in use, there are men who take a great pride in exhibiting their physical strength. Such men should be subjected to an educational program showing that exhibitions of this type are not appreciated by their co-workers and usually result in the injury of an innocent bystander. Men referred to as "smart guys" are men who usually don't know how to exercise anything so unspectacular as good judgement.

13. *Goggles.* A large percentage of workmen resent wearing goggles. This is due in many instances to poor-fitting goggles and sometimes a cheap-composition goggle. The most effective way to encourage the extensive use of goggles is (1) to provide good-quality goggles, and (2) to get a group of workmen to cooperate with management on a plan to stress the use of goggles for eye protection.

14. *Flashlights versus finger feels.* In maintenance work around heavy equipment it is often necessary to insert sections where the fitting point cannot be seen easily because of darkness. The common practice is to insert the hand or fingers to feel how close the sections are to alignment. This can result in the loss of fingers, and in some cases, arms. A flashlight will usually give a clear view of the alignment. One should always be within reach of the workman.

15. *Approaching a quarry.* Never approach a quarry without contacting someone in authority who is thoroughly familiar with the cycle of operation and shooting periods. Approaching a

(Concluded on next page)

**shorter overall length**

**— lighter weight**

Here is another outstanding CP development—the ROTORDrifter, with its built-in rotary feed motor.

CP drifters have long been recognized for their exceptional drilling speed, powerful rotation, low air consumption and minimum maintenance.

To these advantages Chicago Pneumatic now adds a new and more efficient feed, actuated by a vane type rotary motor, built into the drill. With this motor the necessity for a second air hose is eliminated.

The use of this motor of simple design, with a spur gear drive to the feed nut (the feed screw remains stationary), permits the construction of a drill of—Shorter overall length . . . Lighter weight . . . Exceptional balance . . . Minimum number of working parts . . . Low upkeep.

**CP-50N ROTORDrifter—**  
3" cylinder bore

**CP-60N ROTORDrifter—**  
3 1/2" cylinder bore

Consult your nearest CP Branch Office  
for full particulars.

Heart of ROTORDrifter—the Rotary Motor



**CHICAGO PNEUMATIC  
TOOL COMPANY**

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES  
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

## Alert Your Workers

(Continued from preceding page)

quarry from a vacated side may bring the individual into the quarry at a time when a blast is to be discharged.

### Heat-Treating and Loading

Mr. Beckwith concluded his talk with some remarks on heat-treating and loading.

1. *Straightening heat-treated bent members.* Heavily loaded heat-treated sections that bend in use should never be straightened by heat. In applying heat, the benefits of the heat-treating are lost and the elasticity limit tremendously lowered as well as the ultimate strength.

2. *Stiffness of sections.* It is often thought that a member can be made more rigid through heat-treatment. This is not true, says Mr. Beckwith. Heat-treatment affects only the strength of a member and fatigue life.

3. *Modulus of elasticity.* Dividing the stress per square inch by the elongation in one inch is the modulus of elasticity. Through this it is possible to register the unit stress upon any stressed member by the use of extensometers and other equipment for this work. The elastic limit and deformation points can be registered through the use of extensometers and other testing equipment.

4. *Sharp corners and quickly diminishing sections.* Sharp corners and abruptly changing cross sections bring about concentrated loading which causes early ruptures. Many unit section failures are not from the basic or computed load, but the secondary load developed through the deformation of the structure.

5. *Tension of cable slings at various angles.* An angle of 45 degrees with 1,000 pounds gives a cable loading of 705 pounds. An angle of 30 degrees with 1,000 pounds gives a cable loading of 1,000 pounds. An angle of 5 degrees with 1,000 pounds gives a cable loading of 5,735 pounds.

6. *Kinetic loading.* A weight of 1,000 pounds dropping a foot will give a static cable load of 54,000 pounds; 1,000 pounds dropping 2 feet will give a static cable load of 76,000 pounds; 1,000 pounds dropping 3 feet will give a static cable load of 93,000 pounds. Most 1½-inch-diameter plow-steel cable 6 x 19 will reach its elastic limit resisting a 1,000-pound free drop load of 3 feet.

### Membrane Compound For Curing Concrete

A membrane curing compound is made by Wall Products, Inc., Foot of Centre St., Newark 2, N. J. Made under the trade name of Klearcure, it is said to be tough and pliable, and easy to apply at any temperature at which concrete may be placed. It does not require wetting down, piping, or removal after the curing period.

Klearcure can be applied by hand or power spray or by brushing. The manufacturer states that it will not freeze or deteriorate when subjected to various temperatures. It may be applied with or without a vanishing dye.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 49.

### Two New Catalogs Issued Covering Diesel Engines

Two eight-page diesel-engine pamphlets are being distributed by the Industrial Power Division of the International Harvester Co., 180 No. Michigan Ave., Chicago 1, Ill. They give complete specifications for the UD-14A and UD-18A diesel engines and power units. The UD-14A is rated at 76 hp as a power unit when operating at 1,400 rpm; the

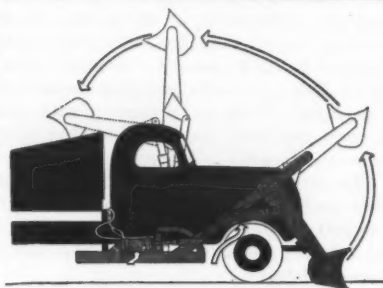
UD-18A, 125 hp at 1,600 rpm. The UD-14A is described in Catalog A-96-KK; the UD-18A in Catalog A-95-KK.

Bearing areas, moments of inertia, material specifications, and dimensions are listed. Performance charts include power curves for peak horsepower, intermittent horsepower, and continuous horsepower. Corresponding torque curves demonstrate the lugging ability of the engines. Fuel consumption at wide-open throttle and part throttle is plotted. Listed, too, are a variety of ways a basic engine can be equipped to satisfy a user's needs.

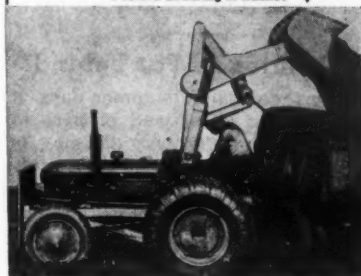
Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 72.

### Goodyear Sales Manager

O. A. Schilling has been named Eastern Sales Manager of The Goodyear Tire & Rubber Co.'s Mechanical Goods Division. He succeeds H. D. Foster, who was recently appointed Manager of the Division.



▲ Complete Digging and Loading Unit  
Positive Lowering of Bucket ▼



## FAST EFFICIENT LOADING IN ONE OPERATION

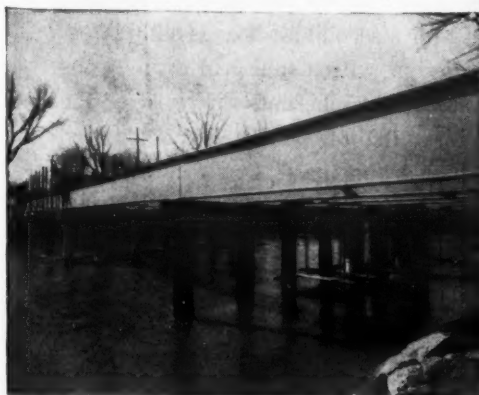
Years of research and grueling service have proved the ability of the Owen Loader to stand up under the toughest digging and loading jobs. Easily mounted on standard trucks and tractors. Write for detailed information on how it will speed loading on your jobs.

**Marion Machine Company**  
MARION, NORTH CAROLINA

# STEEL for Highway Bridges by BETHLEHEM

What are your needs in highway bridge-building? Whether it's to be an all-steel bridge, or reinforced concrete, or concrete-and-steel, you can count on Bethlehem supplying all the steel that the designs require.

Structural steel . . . reinforcing bars . . . reinforcing trusses . . . steel "Battle-deck Floor" . . . single and multiple-strand bridge cable and suspender wire ropes . . . steel-sheet piling and steel H-piling . . . these and many other steel products for bridge-building are supplied through the nearest Bethlehem district office, or through Bethlehem Steel Company, Bethlehem, Pa.



### STEEL SHEET PILING

There are many applications for Bethlehem Steel Sheet Piling in the construction of highway bridges. Use it in temporary cofferdams, in the construction of bridge foundations, and in abutments and retaining walls. This piling is rolled in a wide range of sections, including straight, arch and deep-web, and Z-type sections.

### STEEL H-PILING

Steel H-Piles have high column strength. They are used to best advantage in locations where they can be driven into hard ground material such as hard-pan or shale or to firm bearing on solid rock. In such cases extremely high bearing capacities can be developed.

Bethlehem Steel H-Piles are special wide-flange structural steel shapes having web and flanges of the same thickness. They are used in bridge foundations in the same manner as other types of bearing piles.

### "BATTLEDECK FLOOR"

Steel "Battledeck Floor" is as light as timber but more durable than concrete. Where traffic is heavy or the bridge span of considerable length, the weight of the flooring will naturally be an important factor in the cost of the steel structure required to carry it. In such cases "Battledeck Floor" should be given full consideration.

"Battledeck Floor" has an advantage over other steel floors designed for lightness in that it is not composed of thin sections. It consists of standard rolled beams, placed lengthwise of the traffic, with a flat plate of substantial thickness welded over these beams. It is therefore assured of a life as long as that of the bridge which supports it.

**BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.**

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

**STEEL FOR HIGHWAYS**  
Road Joints    Reinforcing Bars    Bar Mats  
Guard Rail    Guard Rail Posts and Fittings  
Wire Rope    Hollow Drill Steel  
Fabricated Structural Steel    Sheet and H-Piling  
Spikes    Bolts and Nuts    Tie-Rods  
Timber Bridge Hardware

**BETHLEHEM STEEL**



# Dredge Digs Channel For Diversion of River

**Craft Is Assembled at Dam Site; Cuts Into One Bank So Cofferdam May Be Built On Opposite Side**

A DIVERSION channel is being dug along the east bank of the Savannah River so that a cofferdam may later be constructed across the west half of the stream. This contract is part of the Clark Hill Project 22 miles above Augusta, Ga. It is an important preliminary to constructing the concrete and earth-embankment multiple-purpose dam which will be more than a mile long. The channel will also serve as a tailrace below the new powerhouse. Excavated material pumped ashore will provide the necessary fill for the switchyard which will be located east of the powerhouse.

Clark Hill Dam (see C. & E. M., July, 1947, page 25) is a Corps of Engineers project. It includes navigation, flood-control, and hydroelectric power features; it will take three years to build; and it will cost approximately \$45,000,000. A contract for digging the diversion channel was awarded by the Corps of Engineers to the Atlantic Dredging & Construction Co. of Okeechobee, Fla.

In the original plan of construction, the channel excavation was set up as a land-equipment job. But when the present contractor submitted a bid to do the work by hydraulic dredging, the job was re-advertised to include an option covering either method of excavation. The Atlantic Dredging & Construction Co. again was low with a bid of \$282,040 as compared to the engineers' estimate of \$293,890. The work is being done by the new dredge Clark Hill, assembled by the contractor at the dam site.

## Channel and Ditches

At the dam site the Savannah flows nearly due south and measures 600 feet between banks. The new channel is being dug into the east bank for a maximum width of 450 feet. It starts about 1,000 feet above the base line of the dam and cuts in on a taper until the full width is reached. Below the dam the line of the new channel swings back gradually to meet the river bank at a point 2,400 feet south of the beginning of the cut.

At this point the elevation of the river is 188.0, with the water from 10 to 12 feet deep. Ground elevation along the east bank averages around 200.0. Upstream from the base line the channel is being dredged to elevation 177.0, or to the top of rock, whichever is higher. Downstream from the base line the channel is being dug 2 feet deeper, which means that a maximum 20-foot cut must be removed. The back slope along the east bank of the diversion channel is 2 on 1.

The contract got under way in January with the clearing of the 35-acre area for the channel and switchyard-fill locations. A crew of 35 equipped with a power saw for the large trees, and crosscut saws, axes, and machetes

for the rest of the trees and bushes, cleared the site. Because of the heavy January rains falling on this river-bottom lowland, tractors could not be operated over the soft mud to bring the trees out. Most of the timber was brought to the edge of the clearing by hand. Later on during drier weather a tractor-digger removed the large trees remaining, and pushed over the stumps.

Before any dredging could be started, two drainage ditches were first dug, one above and the other below the base line of the dam. As their name signifies, these ditches will provide drainage to the site and will also carry away the surplus water from the hydraulic fill. The upper ditch is about 800 feet long, 10 feet wide at the bottom with 2 on 1 side slopes, and averages 5 feet in depth.

It empties into the river above the beginning of the channel.

The lower, and much larger, ditch also empties at an angle into the river at a point below the end of the new channel. This ditch is around 2,400 feet long, 20 feet wide at the bottom with 2 on 1 side slopes, and varies in depth from 6 to 16 feet. Both ditches were dug by a Bucyrus-Erie E2 dragline with a 55-foot boom and a 1½-yard bucket.

Excavated material amounted to about 20,000 yards from the ditches and 35,000 yards from borrow sources. It was used to build up an earth dike at the downstream toe of the east embankment, which is under construction by a different contractor. This retaining dike kept the hydraulic dredging operations from interfering with the placing of fill in the earth section of the main dam. It was also continued, with an average height of 6 feet, until it surrounded the switchyard-fill area.

The enclosure, measuring about 1,000 x 450 feet, will be built up to elevation 233.0. Successive lifts of hydraulic fill

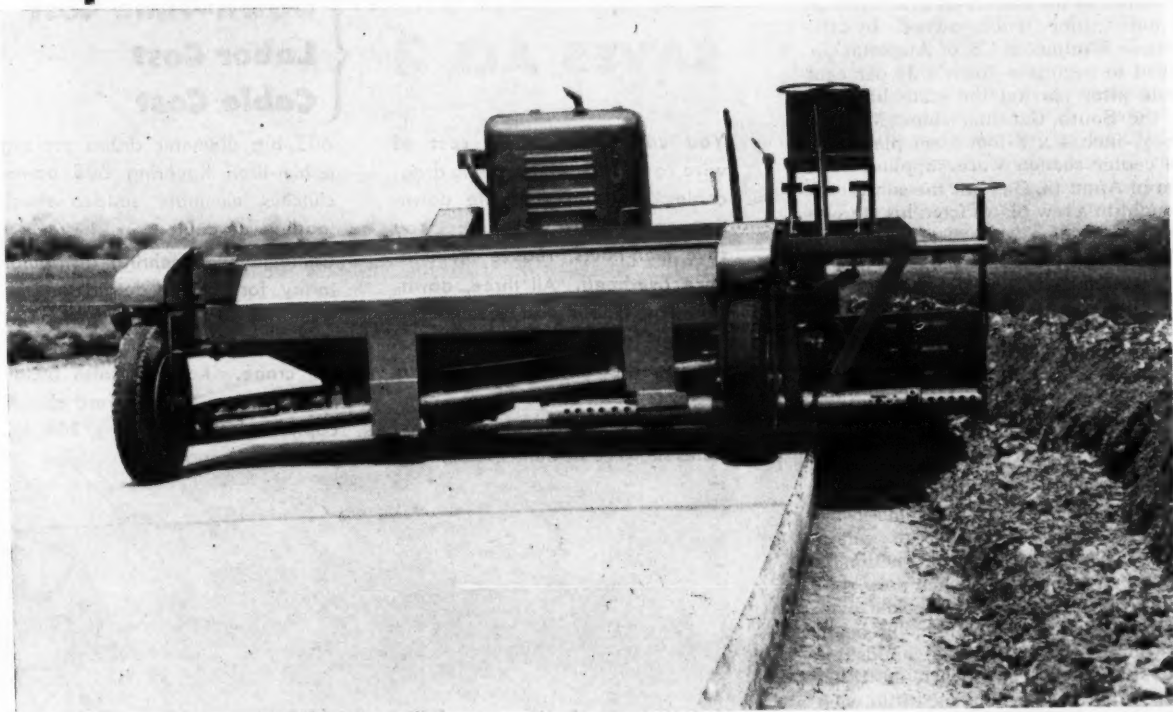


C. & E. M. Photo

A Bucyrus-Erie E2 crane picks up the B. B. Sanders, a 26-foot tug, swings it around, and launches it in the Savannah River. The Sanders moves anchors on the dredge Clark Hill, transfers pipe, shifts crews, and does other jobs.

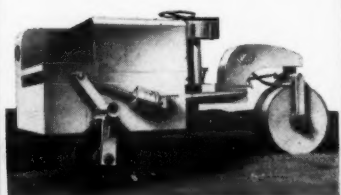
will be retained by other dikes which will be constructed from time to time as they are needed. Breaks are left in the (Continued on next page)

## ROAD WIDENING is Easy, Fast and Economical with an APSCO WIDENER



This APSCO Model 80 (front view) averages 5 tons per minute delivered and laid in the trench.

● The APSCO Trench Roller is an ideal companion piece for the Widener. The pneumatic tired leveling wheel is a real feature of this machine. Write for details!



**ECONOMICAL**—This widener is ideal for road contractors and highway departments who have roads to widen or shoulders to build. In most cases forms are not required, effecting a considerable saving.

**EASY**—Two man crew operates it. Driver sits directly over the work—full view ahead and behind. All controls within easy reach, including independently connected brakes to driving wheels. Dump truck backs up to hopper, is pushed along as widener travels forward.

**FAST**—The general design and specifications, resulting from careful study of widening problems, together with broad experience, combine to produce an efficient, speedy machine which will soon pay for itself in time and money saved.

**FLEXIBLE**—Standard unit spreads 2' to 4' strip of sand, gravel, dirt, stone (not bituminous mix—altho Model 60 readily handles bituminous mix also) to any depth. Handles up to 6" material.

Write for Detailed Specifications!

**THE ALL-PURPOSE SPREADER CO.**

Fuller Road

Elyria, Ohio

**COMPLETE  
WELL POINT SYSTEMS  
WILL DRY UP ANY  
EXCAVATION**

*Faster—More Economically*

Write for Job Estimate and Literature

**COMPLETE  
MACHINERY & EQUIPMENT CO., Inc.**

Dept. C  
36-40 11th St., Long Island City, N.Y.  
Tel. IRonsides 6-5600

## Dredge Digs Channel For Diversion of River

(Continued from preceding page)

dikes so that the water can return to the river via the drainage ditches. The average height of the fill area above the original ground is 33 feet. During construction of the dam this area will be occupied by the yards and shops of the contractors doing the concrete work. Later it will be the permanent switchyard site for the electrical equipment within the powerhouse.

### Assembling the Dredge

The lower drainage ditch was not at first dug all the way to the river. A plug or section of earth was left in place at the outlet end so that the new dredge could be floated in the enclosed strip of water. For the ditch was filled with water flowing into it from a small creek at the upper end, aided by a Couch 14-inch pump at the lower end. The 6,000-gpm pump, powered by a Caterpillar 4400 engine, lifted the water 14 feet from the Savannah River over the plug into the big ditch.

In the meantime the contractor was assembling a new dredge on the bottom lands, about 200 feet off the south bank of the drainage ditch. For the hull, four tanks were fabricated from steel plates  $\frac{1}{4}$  inch thick on bottom and top, and  $\frac{3}{8}$  inch on the sides. Each tank was 35 feet long x 8 feet wide x 6 feet deep and weighed 8 tons. They were delivered to the site on an International 16-ton trailer truck owned by the Broome Equipment Co. of Augusta, Ga. It had to negotiate down a 24 per cent grade after leaving the state highway on the South Carolina side. Most of the  $\frac{1}{4}$ -inch 4 x 8-foot steel plates for the center section were supplied by a firm in Augusta, Ga., but the contractor brought in a few plates from his storage yard in Florida.

These individual plates were then assembled by welding them together and reinforcing them with 4 x 4 angles on an average of 3-foot centers. The completed section was 70 feet long x 8 feet wide, with an end plate, front and back, 6 feet deep. Two tanks were then fastened along each side of the flat plate to form a barge 70 feet long x 24 feet wide x 6 feet deep.

With the dredge machinery and other gear installed, the craft displaces 120 tons and draws 30 inches of water. Amidships, the center well section is left open to house the machinery, but at the bow and stern it is decked over with 5/16-inch plate. A 10-inch I-beam runs across the center well amidships as a stiffener. At the stern an 18 $\frac{1}{4}$ -inch-diameter hole is burned into each of the after tanks to serve as spud wells.

The plates and tanks were welded together by two electric welders, a Westinghouse 300-amp and a G-E 200-amp. Reverse polarity was used for about 80 per cent of the job. Flat, vertical, and overhead welding methods were used in the work. A watertight bulkhead was put in amidships, while two fuel tanks, holding 2,400 gallons each, were built into the bow tanks on either side of the main pump. The hull was assembled on log rollers so that launching could be easily handled.

From the Lawrence Sand & Gravel Co. at Bennettsville, S. C., the following dredge equipment was obtained: ladder, A-frame, front and after gantry frames for the ladder and spuds, and hoisting gear. These parts were shipped to the site by truck and trailer. The contractor brought a large amount of equipment from his headquarters in Florida, including cutter head, shore and pontoon pipe, and pontoon cylinders, all of which was shipped by barge to Augusta. Because of low water, the barge was unable to go all the way up the river.



C. & E. M. Photo

Here is a bow view of the dredge Clark Hill after the spuds have been set in place. Atlantic Dredging & Construction Co. assembled it at Clark Hill Dam site to dig a diversion channel along the east bank of the Savannah River.

So the equipment was transferred to trucks which hauled it the rest of the way. Other equipment was purchased from manufacturers and delivered to the site, usually by rail to Augusta and

by truck for the remaining distance.

Most of the machinery was installed in the hull when it was still on land. After six weeks' work the dredge was ready for launching, and on March 25

two D8 tractor-dozers pushed it along on the rollers until it slid into the drainage ditch. There it was christened "Clark Hill" after the first project on which it went into operation. The rest of the machinery and gear was fitted into place. And the big pump at the lower end of the drainage ditch then began sucking water from the ditch and returning it into the river. After the level of the water was lowered to that of the river, the dredge cut through the plug earth dike and entered the Savannah. Work then got under way at the south end of the diversion channel.

### The 12-Inch Diesel Dredge

The prime mover of the Clark Hill is a Superior 8-cylinder diesel engine, 9-inch bore x 12-inch stroke, developing 350 hp at 600 rpm. It is located in the center well somewhat aft of amidships, and is supported on two 24-inch I-beams across the bottom of the hold. Compressed air for the engine is supplied by a Curtis 3 $\frac{3}{8}$  x 1 $\frac{1}{2}$  x 3-inch

(Continued on next page, Col. 4)

## KOEHRING 605 Dragline

stepped up by keeping cable

### SAVES ALL 3

You save more than cost of wire rope when you prolong drag-cable life. You eliminate downtime, gain extra yardage. You save man-hours, reduce maintenance overhead. All three, downtime cost, labor cost, cable cost, add up to an important part of your overhead — and Koehring 605 cuts down on all three. Koehring 605 patented fairlead eliminates sharp cable bends. Koehring

### Down-Time Cost Labor Cost Cable Cost

605 big diameter drums prolong cable life. Koehring 605 power clutches eliminate sudden shock loading of cable.

Contact your Koehring distributor today for further details on the Koehring 605. 1 $\frac{1}{2}$  to 2 $\frac{1}{2}$  yards as dragline, 1 $\frac{1}{2}$  yard as shovel, 30-ton crane. Koehring also builds the Koehring 205 (1 $\frac{1}{2}$  yard shovel cap.) and the Koehring 304 (3/4 yard shovel cap.).



## KOEHRING COMPANY



## Contractors' Tools

A line of paving breaker accessories, hollow drill steels and hand tools for contractors' use, is made by the Rock Bit Sales & Service Co., 2514 E. Cumberland St., Philadelphia 25, Pa. Breaker and digger tools include moil points, asphalt blades, clay scoops, and chisel bits.

Others in the line are wrecking and aligning bars, hand stone drills, bull points, drift pins, chisel bits, digging blades, frost wedges, tamping shanks, pads and sheeting-driver attachments, drill-steel couplings, hollow drill steel, auger drills, etc.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 87.

### "Si" Harris Joins Soule Co.

"Si" Harris, formerly Western Sales Manager of LaPlant-Choate Mfg. Co., has joined the staff of Soule Equipment Co., in the capacity of sales represen-



C. & E. M. Photo

A Caterpillar D8 with a 20-foot A-frame moves a GE 200-amp electric welder to another location. The welder was one of two used in assembling the dredge Clark Hill.

tative. He will make his headquarters in Fresno, Calif., and will represent such

Soule lines as LeTourneau, Bucyrus-Erie, Buda, Pioneer Electric, and others.

## Dredge Digs Channel For Diversion of River

(Continued from preceding page)

compressor driven by a Wisconsin engine. It fills two tanks with air at 250-psi pressure; in normal starting, 18 cubic feet of air is required by the engine.

The diesel operates the main pump forward by a direct drive, and also drives a belt off the flywheel. The latter activates an Ingersoll-Rand 3-inch service pump which cools the thrust bearing, supplies water to the pump stuffing box, and also lubricates the Ryertex and Cutless bearings on the cutter-head shaft.

Located amidships is the Georgia Iron Works pump with a 14-inch intake and a 12-inch discharge. The impeller has a 39 1/4-inch outside diameter with three vanes 34 inches long. Running along overhead between the pump and the engine is a 6-inch I-beam, 28 feet long; it supports a Chisholm-Moore 2-ton hoist used for installing parts in either piece of equipment.

In the pipe line directly in front of the pump is a manhole which is opened when the line has to be cleaned or debris removed. On the shaft directly behind the pump is an SKF pillow-block spring bearing, followed by an SKF double roller pillow-block thrust bearing. Next in line is a Dodge Model 100D Diamond D clutch, backed by a babbitt pillow-block bearing which is connected to the diesel engine by a Poole flexible coupling.

From the bow of the dredge a 25-foot A-frame supports a 35-foot ladder, at the end of which is a 36-inch-diameter cutter head with five blades. The blades are kept razor-sharp by coating the inside with a single thickness of Haynes Stellite Hascrome, electric-welded from 3/16-inch rods. Behind the cutter head is a Cutless bearing, while the 4 3/8-inch-diameter shaft carries four Ryertex bearing inserts. All are lubricated with water. The 14-inch intake is oval-shaped at the mouth with 8 and 16-inch diameters to get the material away fast and through the line to the pump.

Within the deck house a Caterpillar D7700 diesel engine is hooked to a Fairbanks-Morse 55-kw dc generator, 220 amps and 250 volts; this supplies current to the Westinghouse 50-hp motor driving the cutter head. Through a reduction gear the rpm is reduced from 1,750 to 17. The Clark Hill can dredge at a depth of 28 feet.

In the forward end of the deck house is a Lidgerwood hoist that has been redesigned to work in the width available. Three drums are in a row, front to back, one slightly above the other; another drum is a little off to each side. The two front drums in the row control the swing of the dredge which can move from 125 to 150 feet on a 3/4-inch cable. On this job a tree stump on the bank serves as an anchor on the starboard side, while a 500-pound anchor is used off the port side. Behind these is the drum for raising or lowering the ladder. The two drums off to the sides are for the spuds. The hoist is driven by a Caterpillar 4400 diesel engine.

### Through the Pump

The intake line has a 10-foot rubber connection at the top of the ladder where the 14-inch line runs back to the pump. From the pump the 12-inch discharge line leaves at a 10-degree angle from the top of the pump, runs up to the port-side deck, and continues on to the stern. There are the two spuds which move within inside wells on 10-foot centers.

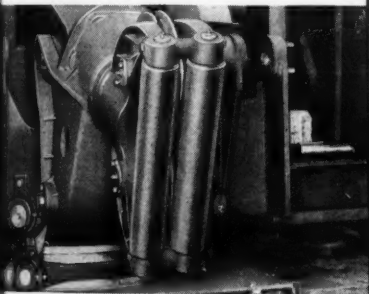
These spuds were originally masts on surplus merchant ships, and tapered from 18 to 13 inches in diameter in their

(Concluded on next page)

## Profits cost low

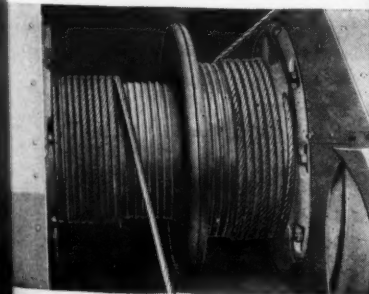
### FAIRLEAD SAVES CABLE

With bucket at any angle, Koehring-patented rotating fairlead keeps drag cable running over big 15-inch sheaves. No cable wearing bends. Cable can't jump out.



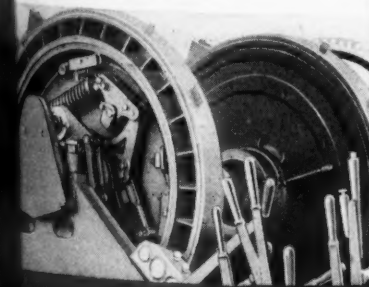
### DRUM SAVES CABLE

Slack cable hugs drum grooving because drag cable spools over top of drum. 19-inch drag lagging has large cable capacity. Long lead from fairlead to drum.



### CLUTCH SAVES CABLE

Koehring exclusive power clutches prevent shock loading, are easy on cable. You always get smooth engagement without jerking because speed of drum-shaft rotation controls speed of engagement.



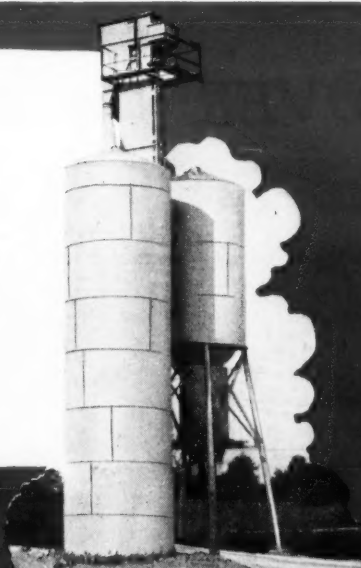
### Top Capacity plus Full Portability

Johnson Twin Silo bulk cement plant stores as much as 1550 barrels of cement, yet is fully portable. Welded construction speeds erection. When disassembled, units easily load on flat cars or flat bed trucks.

#### Other sizes:

1274 bls. 990 bls. 708 bls.

**C. S. JOHNSON**  
CHAMPAIGN, ILLINOIS  
KOEHRING SUBSIDIARY



### Straight, Clean Trenches for Sewers, Pipe, Water Mains

Parsons 250 Trenchliner\*, product of more than 40 years of trencher building experience, incorporates all the desirable features that make money for you on trenching jobs. Telescoping boom for easy depth adjustment. Shifts from side to side across full Trenchliner width.

\* Reg. Trademark.



**PARSONS COMPANY**  
KOEHRING SUBSIDIARY

NEWTON,  
IOWA

### Full Batch Discharged in 7 Seconds

Tilted Flow-Line Discharge Chute, exclusive on the Kwik-Mix Dandie line of concrete mixers, reaches deeper into the drum, intercepts tumbling concrete at just the right angle to maintain natural flow-line in discharge. Kwik-Mix Dandie mixers are available in the following sizes: 3 1/2-S, 6-S, 11-S, 16-S.



**KWIK-MIX COMPANY** PORT WASHINGTON  
KOEHRING SUBSIDIARY WISCONSIN

MILWAUKEE 10,  
WISCONSIN



## Dredge Digs Channel For Diversion of River

(Continued from preceding page)

36-foot length. The taper was corrected by welding eight 3/8-inch-wide strips of steel, cut to the required pitch, lengthwise down the masts. The result is a spud weighing 3 tons, hollow on the inside with an outer shell of 3/8-inch plate, and with an 18-inch-diameter cross section for the full length. Moving or advancing the dredge is done by means of the starboard spud, while the port spud is used when the dredge is working. They are supported in a 26-foot-high gantry frame which is held by two backstays set at a 60-degree angle.

From the stern port corner of the dredge the 12-inch discharge line leaves through three 18-inch sections of pipe which are connected by rubber sleeves. With the short pipe lengths and flexible connections, both vertical and lateral movements are possible. The floating or pontoon line is 320 feet long. It consists of eight lengths of 40-foot pipe with each section supported by two oval cylinders, 14 feet long x 42 inches wide x 30 inches deep. Rubber sleeves furnish the floating line with flexible connections.

When the floating line reaches the shore, a landing is simplified by using a pontoon barge. This consists of two cylinders with a deck on top, equipped with a 20-foot A-frame and hand winch. From here the land line runs out from 1,000 to 1,200 feet in 16-foot lengths of 12-inch pipe which are connected by slip joints.

The dredge pumps from 3,000 to 5,000 cubic yards of sand and silt over a 24-hour day. The three 8-hour shifts are divided among the 16 members of the crew. Each shift has a leverman who, by watching the vacuum and pressure gages in the control house and the depth gage on the A-frame, controls the operation of the dredge; an engineer to look after the engines; and a mate for general supervision. The day shift has three deck hands, while the two night shifts have two each. The deck hands also shift the land line about when necessary.

Auxiliary floating equipment includes the B. B. Sanders, a 26-foot tug powered by a Kermath 65-hp diesel engine. This dredge tender moves the anchors, trans-



C. & E. M. Photo

Fred A. McKenzie, Jr. (left) of Atlantic Dredging Co., who directed the building of the dredge Clark Hill; William Ottinger of the Corps of Engineers; and James McKenzie, Fred's brother, who is Superintendent of the dredging project.

fers pipe, shifts the crews around, and hauls supplies. Diesel fuel is supplied by the Standard Oil Co. of N. J. out of Columbia, S. C., via tank truck from Augusta to the edge of the river; there it is transferred to a 10,000-gallon float-

ing tank. This is then towed out to the dredge and pumped into the two 2,400-gallon storage tanks aboard. Before the dredge completes its work—completion is scheduled for September—it will be lifting material 46 feet from the river cut to the top of the switchyard fill.

### Quantities and Personnel

The major items of the diversion-channel contract include:

Channel excavation	570,000 cu. yds.
Excavation for earth-dam fill	55,000 cu. yds.
Dumped riprap	7,000 cu. yds.

The dredge Clark Hill was assembled and constructed under the supervision of Fred A. McKenzie, Jr., of the firm of Atlantic Dredging & Construction Co. His brother, James McKenzie, is Superintendent of the project. For the Corps of Engineers, Torald Mundal is Resident Engineer and N. H. Siglow is Assistant Resident Engineer, with headquarters at Augusta, Ga. Colonel Paschal N. Strong is District Engineer at Savannah, Ga. This work is being performed in the South Atlantic Division

of the Corps of Engineers; Colonel J. W. Gillette is Division Engineer, with headquarters at Atlanta.

### History of Differentials Is Subject of Sound Film

A sound-motion picture which tells the story of the development and use of the truck-axle differential is being distributed by the Detroit Automotive Products Corp., 8701 Grinnell Ave., Detroit 13, Mich. The picture is available in 16 or 35-mm sizes and takes 20 minutes to show; it was prepared by the Jam Handy Organization.

Through the use of working models, the functions of a conventional and a Detroit Automotive No-Spin differential are explained. Through a special process of stop-motion photography, a No-Spin differential is shown in actual operation from the inside.

The title of the picture is "Pulling for Profits"; it can be obtained for showing at group meetings or by dealers by writing to the manufacturer.



# No major repairs!"

Outstanding production records are an old story to Bucyrus-Erie excavators, which have consistently piled up long hours of operation with low maintenance costs. Take this Bucyrus-Erie 30-B dragline, for instance. Here is part of a letter received from Mr. J. G. MacLachlan, manager of the Hudson Bay Railway, Manitoba, Canada:

"The machine has been in continual seasonal operation since September, 1926 . . . has excavated 100 miles of side and off-take ditches, largely in permanently frozen ground, and other excavations to a total of approximately 1,000,000 cubic yards. We have had to make no major repairs."

There is no magic formula for the long life of Bucyrus-Eries. Durable parts in an efficient basic design; easily-made, long-lasting adjustments; simple, effective lubrication—all these play an important part in keeping Bucyrus-Eries on the job year in, year out, with a minimum of "time out" for repairs and with consistently economical operation.

Your Bucyrus-Erie distributor can show you why today's Bucyrus-Erie 3/8 to 2 1/2-cu. yd. excavators can be depended upon for long service and still be "easy on the upkeep." Let him give you more information.

**BUCYRUS-ERIE CO.**  
SOUTH MILWAUKEE, WISCONSIN

# GRIFFIN

# R I F F I N

## WELLPOINT SYSTEMS

## JETTING PUMPS

## SALE-RENT

Distributors

**GRIFFIN  
ENGINEERING CORP.**  
2016 E. Adams St.  
JACKSONVILLE, FLA.

**GRIFFIN  
EQUIPMENT CO., INC.**  
548 Indiana Street  
HAMMOND, INDIANA

**GRIFFIN WELLPOINT CORP.**

881 EAST 141st ST. • NEW YORK 54, N. Y.

Phone: MIlrose 5-7704-5-6





The Brunson No. 50 transit features the company's patented ball-bearing dust-proof center designed to give longer-lasting efficiency.

### Surveyors' Transit Is Ball-Bearing-Mounted

A precision transit mounted on ball bearings is made by The Brunson Instrument Co., 1405 Walnut St., Kansas City 6, Mo. The instrument weighs 15½ pounds. The telescope is of the internal-focus type, 10¼ inches long, with a magnification of 22 times. Standards are of the U-type, cast in one piece.

The transit has a stiff-leg tripod, 58 inches long, with lugs on the shoes and a standard 3½-inch thread. Other equipment includes a hardwood box with side door, a 12-ounce plummet, and usual accessories, adjusting pins, screw driver, and reading glass.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 44.

### Model Added To Line Of Electrode Holders

Designed to round out its line of electrode holders is the Model A-316 Twecotong of Tweco Products Co., P. O. Box 666, Wichita 1, Kans. It is a smaller companion to the A-14 and A-38 holders and is designed to hold electrodes from 1/16 through 3/16 inch. It exerts a 95-pound bite on a 3/16-inch rod.

The tip and body insulation is of molded laminated glass-cloth Bakelite in the patented Tubular-Keyed Tweco design. The insulated spring is Neoprene-covered. The cable connection is a simple clamp, plus socket for soldering when desired. The holder will carry 250 amps; it weighs 18 ounces; is 9 inches long; and has a palm span of 2¾ inches.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 8.

### Manual Describes Bonds For Construction Industry

In August, 1946, the Association of Casualty and Surety Executives introduced new forms of performance bonds and labor and material payment bonds. These resulted from study of the bonding experience on private construction.

For the convenience and information of members of the construction industry, a free manual has been prepared by the Lucy & McNiece General Agency, 11 W. 42nd St., New York 18, N. Y. It contains suggestions to assure complete protection under all forms of contract bonds. It also explains the mechanics of surety underwriting, the rates applicable to various types of contracts, and contains other pertinent information.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 76.

### Reports on Pavement For Airport Runways

A discussion of the requirements for airport flexible pavements has been made available by the American Road Builders' Association. Published as Technical Bulletin No. 118, 1947, it is a transcription of a report delivered by W. R. Macatee at the Second Annual Michigan Aeronautics Conference. Mr. Macatee is Manager of the Airport Division of the ARBA.

In his report, he compares runway-thickness requirements as set up by the Asphalt Institute, the Civil Aeronautics Administration, the Public Roads Administration, and the Army Engineers. He compares costs of runway construction over excellent, medium, and inferior subgrades, and the costs for pavements to support heavy aircraft.

Copies of this report may be secured by writing directly to the ARBA headquarters, 1319 F St., N. W., Washington 4, D. C.

## HOT or COLD Mix Asphalt

DUST  
COLLECTORS  
AIR WASHERS  
ASPHALT  
TANKS  
OIL TANKS  
PUMPS



FEEDERS  
DRYERS  
MIXERS  
BOILERS  
OIL BURNERS

## DEPENDABLE

THE SIMPLICITY SYSTEM COMPANY  
CHATTANOOGA, TENNESSEE, U.S.A.

## EVANS THERMO CONTROL FAN



### SAVES MONEY FOR ROAD BUILDERS!

- ★ SAVES ON FUEL!
- ★ SAVES ON LUBRICATION!
- ★ INCREASES POWER!
- ★ REDUCES COST OF MAINTENANCE!

**ABSOLUTE TEMPERATURE  
CONTROL FOR GAS OR  
DIESEL ENGINES**

### HERE'S HOW IT WORKS-



**WHEN ENGINE NEEDS  
LITTLE AIR**



**WHEN ENGINE NEEDS  
MEDIUM AIR SUPPLY**



**WHEN ENGINE NEEDS  
LOTS OF AIR**

**CHANGES PITCH AUTOMATICALLY TO ANY ANGLE ENGINE REQUIRES**

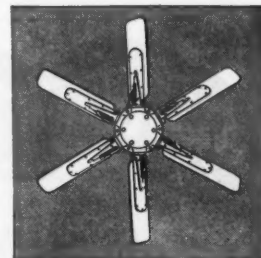
\* T. M. Reg. U. S. Pat. Off.

Road builders must call upon an engine for everything it's got—and engines must go from "idle" to "full load" in an instant. That's when the EVANS Thermo-Control Fan can save engine wear, fuel bills and boost efficiency for you!

It is designed like a modern airplane propeller with variable pitch for automatic precision temperature of coolants in internal combustion engines. From "warm-up" to "full-load", it maintains the predetermined temperatures at which an engine operates with greatest thermal efficiency.

On mobile or stationary engines—gasoline or Diesel—the revolutionary EVANS Thermo-Control Fan enables users to save time and money on every job.

It will pay you to investigate the amazing new EVANS Thermo-Control Fan!



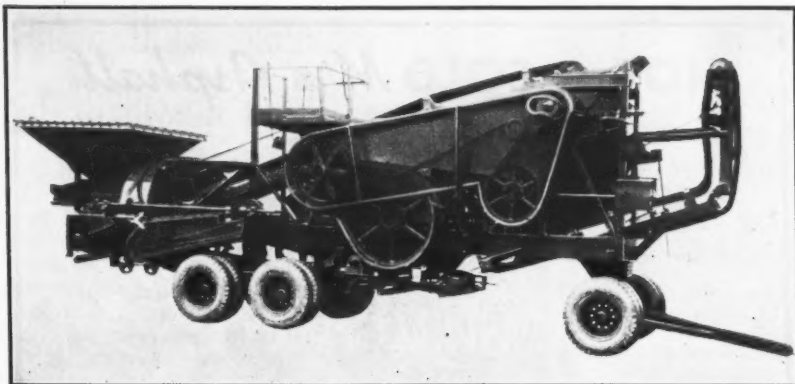
**EVANS**  
PRODUCTS COMPANY  
PLYMOUTH, MICHIGAN

THERMO-AIRE



DIVISION

OTHER EVANS PRODUCTS—\*AUTO LOADER • AIRFOIL FANS • BUS AND TRUCK HEATERS • BATTERY SEPARATORS • HOME HEATERS • LOADING PALLETS • SKY PRODUCTS • STAMPINGS • THERMO-CONTROL FANS • MOLDED PLYWOOD • WATER HEATERS • VENETIAN BLIND SLATS



The new Pioneer Continuflo portable gravel plant is recommended by its manufacturer for quick short job hops where material is required in a hurry.

### Portable Gravel Unit Has 2-Man Operation

High aggregate production is claimed for the new 34-S Continuflo portable gravel plant by the Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis 13, Minn. The manufacturer recommends it for quick, short job hops where material is required in a hurry.

Units consist of a 1024 jaw crusher with SKF bearings; a 24 x 16-inch roll crusher with Timken bearings; and a 2½-deck vibrating screen, 3 feet x 8 feet, equipped with sand screen. Steel-center cord V-belts drive the units from power mounted on the plant, or from an optional drive through a power take-off on a tractor. It is two-man-operated: one on the dragline or shovel, and the other on the plant itself.

Total weight less power units is approximately 40,900 pounds. The plant has a travel length of 41 feet and a height of 12 feet 9 inches. It is equipped with six sets of dual 9:00 x 20 pneumatic tires. A 7-foot hopper, equipped with mechanical feeder, takes the feed at the rear end of the plant. Processed material is delivered from the front end.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 14.

### All-Plastic T-Square

An all-plastic T-square is made by The C-Thru Ruler Co., 827 Windsor St., Hartford 2, Conn. It comes in 15, 18, 24, 30, 36, 42, and 48-inch sizes, or others on special order. The plastic is said to be completely transparent. And the arm is fitted into a specially cut recess to insure a snug accurate fit on the drawing board, the manufacturer points out.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 22.

### Light and Power Plants

Light and power plants ranging in capacity from 250 to 25,000 watts are described in a catalog of the Universal Motor Co., 3234 Universal Drive, Oshkosh, Wis. Four types of control are available for these plants: manual control, remote automatic control, battery

Use—



**CONCRETE  
CURING  
COMPOUND**

Clear or Pigmented

Used wherever concrete must be protected during curing period. Write for details.

**S. P. LYONS** 1805 Courtney Ave.  
Los Angeles 46, Calif.

### Magnetic Hoist Drive On Electric Shovels

The use of the P&H Magnetorque hoist drive as standard equipment on its 6-yard electric shovels has been announced by the Excavator Division of the Harnischfeger Corp., 4419 W. National Ave., Milwaukee 14, Wis. Other features include Directron control, independent propel drive, worm-driven crowd, all-welded construction, and filtered air cab.

Magnetorque drive replaces the usual generator and dc motor with an ac motor. It consists basically of two concentric electric magnets, one rotating within the other. The amount of torque to be transmitted is controlled through variable energizing of the magnetic field. Hoisting operations are therefore smoother, says the manufacturer.

Other advantages claimed for this type of control are: elimination of the hoist generator and its maintenance, smooth Ward Leonard performance with faster plugging, a reduction in

peak power demands, and elimination of the slip-friction hoist clutch.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 17.

### Clamshell Buckets

Features of the E-16 rehandling clamshell bucket are described in detail in a bulletin issued by The Hayward Co., 32-36 Dey St., New York 7, N. Y. Bulletin No. 697 shows how this bucket can be adapted for excavating, mud work, and dredging, in addition to its use for handling sand, gravel, crushed stone, cement clinker, and other bulk materials.

A chart lists bucket load capacities, weights, and dimensions in terms of various materials handled. It also includes figures on recommended wire-rope diameters, reeving, and closing lengths.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 56.

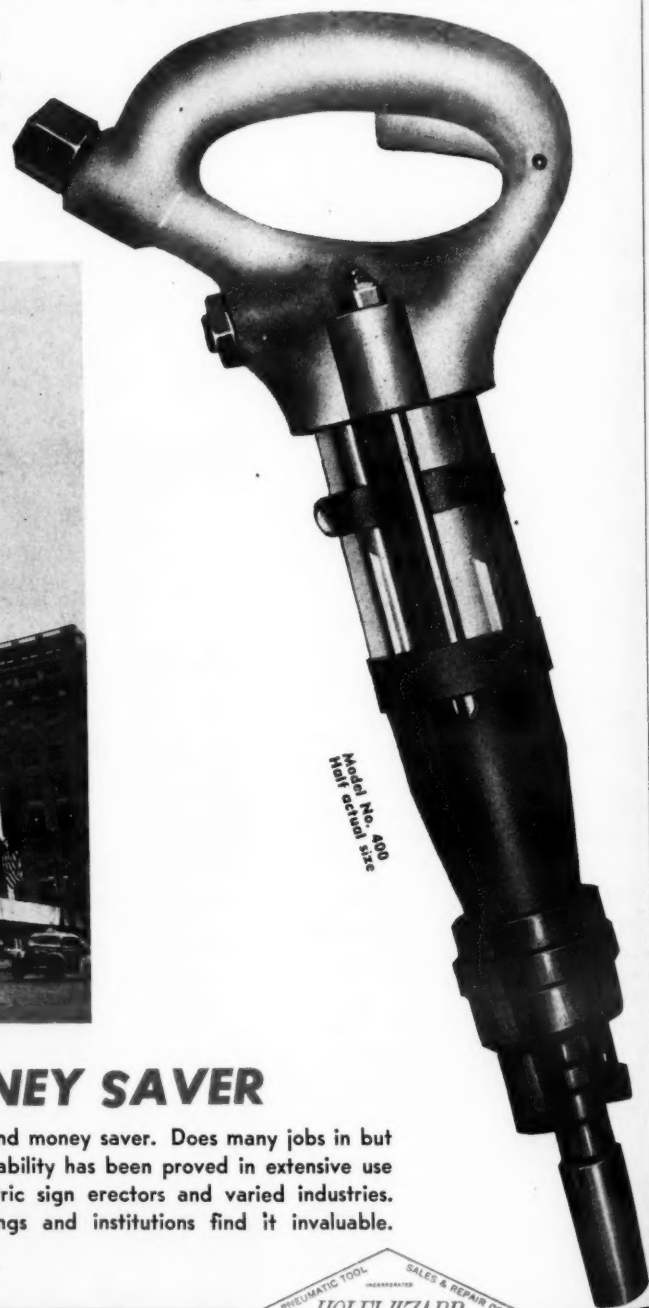
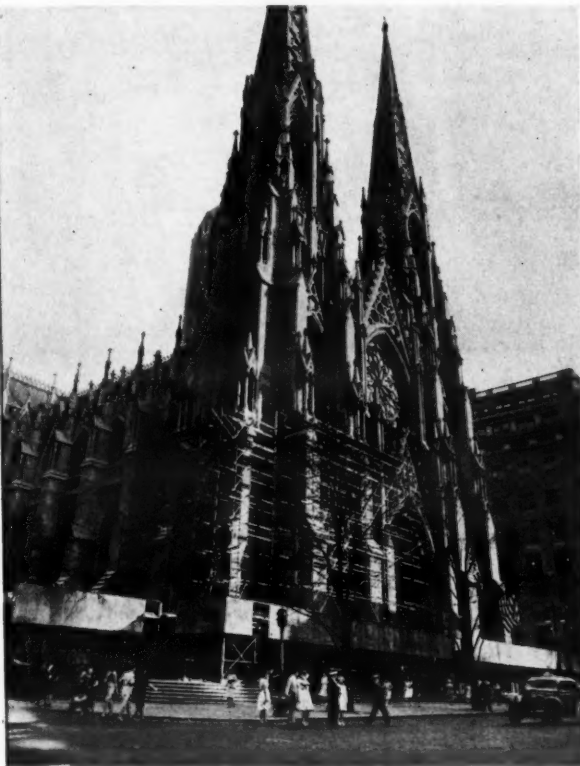
## The HOLEWIZARD

COPYRIGHT PATS. PEND'G

**The Small One-Hand Rotating ROCK DRILL  
HITS and ROTATES  
at the SAME TIME**

**HOLEWIZARDS**

Were used in the recent renovation of world-renowned St. Patrick's Cathedral on famed Fifth Avenue, New York City.



### TIME and MONEY SAVER

The HOLEWIZARD is an outstanding time and money saver. Does many jobs in but one-sixth of the time formerly required. Reliability has been proved in extensive use by leading construction firms, utilities, electric sign erectors and varied industries. Maintenance departments of plants, buildings and institutions find it invaluable.

**Distributor Inquiries Welcomed**

Manufactured by **PNEUMATIC TOOL SALES & REPAIR CO., INC.**  
14-29 THIRTY-THIRD AVE., LONG ISLAND CITY 2, N. Y.



LITERATURE  
ON REQUEST



# Roadbed and Tunnel Blasted in Mountain

## Contractor Gouges New 4.4-Mile Scenic Route Through National Forest Near Alamogordo, N. Mex.

A NEW scenic route, cutting 5½ miles off the existing highway between Alamogordo and Cloudcroft, N. Mex., was pushed rapidly to completion by Henry Thygesen & Co. and Frank P. Llewellyn of Albuquerque. Their \$640,-100 contract with the Denver Division Office of the Public Roads Administration advanced the new route about 4.4 miles through Lincoln National Forest just north of Alamogordo.

The contract included heavy grading, 6 inches of selected base course, and a 500-foot tunnel through one of the most inaccessible mountain ridges in the Sacramento Range. Started July 29, 1946, the job was expected to be finished by July 15 this year in time to accommodate many of the tourists who want to use the new road.

There has been for years an urgent need for a better-aligned wider highway to replace the old road built 34 years ago. Known as New Mexico State Route 83 through this region, the road carries about 240 vehicles a day. A check of this traffic by the Public Roads Administration showed about 75 per cent to be tourists or recreation-minded motorists, with 25 per cent carrying commercial business in the form of orchard and agricultural produce and timber from the logging industry operating in the Sacramentos.

The new highway turns from U. S. 70 north of Alamogordo and follows a canyon route towards Cloudcroft. A tentative contract for the route between U. S. 70 and the Lincoln National Forest boundary has been let to the same company by the New Mexico State Highway Commission. But recent work has been concentrated on the Public Roads Administration contract within the National-Forest limits.

### New Highway Design

The completed selected-base surface on the new embankment and cut sections is 28 feet wide, and designed to take a 22-foot bituminous surface later. Though this route cuts through rough uneven mountainous terrain, maximum grades are 6 per cent and the shortest curve radius is 573 feet.

Blasted almost all the way through conglomerate, limestone, bedded shale, and a few odd sedimentary-rock formations, the various slopes for the new section were set up somewhat as follows:

Height	Embankment Slope	Earth-Cut Slope	Rock-Cut Slope
0-3 ft.	6:1	3:1	¾:1 to 1:1
3-6 ft.	4:1	3:1	.....
6-12 ft.	2:1	2:1	.....
12-30 ft.	1½:1	1½:1	.....
30 ft. and up	1½:1	1:1	.....

A. O. Stinson, Highway Engineer of the Public Roads Administration, was the original location engineer on the road, and also supervised the Thygesen-Llewellyn contract as Resident Engineer.

### Clearing and Scraper Work

The new road lies generally in the north side of Dry Canyon and the south side of Box Canyon, which is about 1,000 feet deep. Low-growing mesquite and desert shrubs grow in Dry Canyon; there clearing was no problem at all, and for all practical purposes negligible. But cedar and pinon trees grow in Box Canyon. There clearing and grubbing were difficult because of rough terrain. At the west end of the job were several short cuts and fills through red New Mexico clay, bedded conglomerate,

and shale. It was possible to hew this material out with tractor equipment. Three LeTourneau Carryalls, a Model K and two FP's, were used behind D8 Caterpillar tractors. A D8 bulldozer was used part of the time for pusher loading, and a D8 tractor with a LeTourneau K-30 Rooter was used ahead of loading.

The cuts were hauled downhill as much as possible, and fills were made in horizontal lifts and rolled both by the hauling equipment and a sheepsfoot roller. Very good progress was made, approaching 600 cubic yards a day apiece for the three rigs. But the formation petered out much too soon to suit big, genial Frank P. "Tony" Llewellyn, the contracting partner who supervised the job.

"After those first few fills we got into the hard rock we expected, and we've been blasting every foot of the way since," he explained. Tony Llewellyn, incidentally, is probably the biggest contractor in the United States so far as his size is concerned. He is a giant of a man, at least 6 feet 7½ inches tall and about half that wide, tipping the scales at 260 pounds. Not an ounce is fat. He is the kind of man whom you'd

expect to reach up to the back of a flat-rack truck, pick up an engine for a heavy-duty shovel, and set it off on the ground without waiting for a crane. Like many big men Tony is friendly and congenial.

### Drilling and Blasting

Almost all pioneer work on the project was done by the drilling crew. The  
(Continued on next page)

## UNINTERRUPTED WINTER TRAVEL

is Assured by

### DAVENPORT - FRINK SNO-PLOWS



ALL TYPES AND SIZES

PLAN NOW for NEXT WINTER. No matter what the snow or ice conditions, you obtain FASTER • SAFER • CLEANER snow removal with the lighter, yet stronger DAVENPORT-FRINK SNO-PLOWS. Available in "V" and Straight Blade types for all sizes of trucks, tractors, road patrols and locomotives. Be ready. Buy early. Write us for complete information.

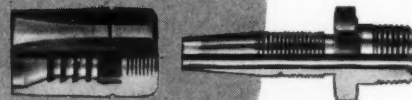
DAVENPORT BESLER CORPORATION

Dept. A  
DAVENPORT, IOWA  
1000 Islands, CLAYTON, NEW YORK

Made in Eastern U.S.A. by CARL H. FRINK.

# Aeroquip

## HIGH PRESSURE HOSE LINES



**TWO PIECES—EACH REPLACEABLE**  
Assembly without special tools. Detachable end fittings can be reused over 100 times. No adjustment or tightening after assembly.

Hose construction: Tube and cover are made of synthetic rubber, oil and grease resistant, reinforced with two high tensile steel wire braids.

Available in the following sizes: ¼, ⅜, ½, ¾ and 1 inch. These fittings are also available to service all types of greasing equipment.

**AEROQUIP CORPORATION**  
JACKSON, MICHIGAN

303 WAREHAM BLDG., HAGERSTOWN, MD. • 327 M & M BUILDING, HOUSTON 2 • 1709 W. 8TH ST., LOS ANGELES 14 • 803 PENCE BUILDING, MINNEAPOLIS 3



C. &amp; E. M. Photo

This Northwest 2 1/2-yard shovel worries a big rock into one of the Koehring Dumptors used by Thygesen-Llewellyn to load out blasted rock. A double-spotting arrangement was possible at the shovel, despite cramped working quarters.

## Roadbed and Tunnel Blasted in Mountain

(Continued from preceding page)

terrain is so rugged that wagon drills could not be carted around. It was so bad in one place that men with jackhammers had to be swung over the point of a precipice on safety ropes to drill the first holes.

Some 16 machines, including Ingersoll-Rand JB-55 Jackhammers, and Gardner-Denver and Worthington sinkers, were used with Timken detachable rock bits and drill steel in lengths up to 20 feet. Two Worthington Blue Brute compressors of 500-cfm capacity each teamed with a Chicago Pneumatic 500-cfm, a Gardner-Denver 210, and a Gardner-Denver 365-cfm to furnish power for drilling.

While the limestone showed a tendency towards difficult drilling where seams, dips, and faults appeared, it was not normally bad in solid form. In the hardest drilling encountered, detachable rock bits traveled 6 inches before they dulled; frequently they went up to 10 feet.

All bit sharpening was done on the job by an Ingersoll-Rand sharpener.

The most difficult formation from the driller's viewpoint was the laminated clay seam, pressed almost as tight as shale. When a drill bit pokes into this formation it will ravel off in pieces too big for the air stream to blow out. Some of the particles will actually settle to the bit collar while the air valve is open. There seems no good way to combat these seams. Drillers worry along until they pass through into harder rock and try to make up for lost time.

Drill footage per man ran up to 150 feet for 8 hours in good limestone, and as low as 60 feet for 8 hours in badly seamed or powder-shaken deposits.

Drill holes were put down generally on 10-foot centers, using small-size drill bits no larger than 2 1/4-inch diameter. Such wide centers for jackhammer work were possible because the rock was so responsive to powder; only about 1/2 pound was used per cubic yard.

The holes were sprung once, usually with four sticks of Atlas Gelodyn No. 3, 40 per cent strength, in 1 1/2 x 8-inch cartridges. After the first springing,

the holes were loaded with Atlas Flo-Dyn No. 4, a granular 40 per cent powder, and stemmed with clay or fine sand. The shots were pulled with No. 6

electric blasting caps in each hole.

Powder was hauled out to the job and stored in an underground magazine. Caps were of course stored separately. Winter temperatures slightly below the freezing point caused big Tony to check up with the Atlas representative, who assured him that Flo-Dyn would not freeze at 25 above zero.

Heavy rock cuts regularly 40 to 60 feet deep were pioneered by bench drilling with jackhammers, and shot; then another bench was drilled after a bulldozer had pushed the first few cubic yards away. In many places the air compressors had to be brought in on the upper road which is old and abandoned, and lies roughly in the same locality as the new project. They were set up with 4-inch steel air headers or air hose leading to the job, and used there until a better location could be made. The old road was also used as an access road to the west tunnel portal.

### Rock Loading and Fills

The entire problem of the job. ac-

cording to Tony Llewellyn, was that of working room. Working quarters were always cramped. So when a Northwest 2 1/2-cubic-yard shovel and a Northwest 1 1/2-cubic-yard rig were brought in, he was faced with the problem of hauling equipment. What was badly needed was a hauling unit that would maneuver easily in tight places, haul a fair load, and be rugged enough to stand the grind of a rough, frozen, rock-filled haul road.

He found an answer in six Koehring Dumptors, powered by General Motors diesel engines and hauling 6 cubic yards of payload. Three Dumptors were put to work with each shovel; the 2 1/2-cubic-yard machine was generally used on short hauls not exceeding 450 feet. In a few places some 900-foot hauls were made with the Dumptors, and their work was later in the neighborhood of 500 feet.

A double-spotting arrangement was possible at each shovel, and the Dumptors were loaded in two passes by the

(Continued on next page)

## Up again down again...

In less than 10 Minutes!

Moving conveyors from one job to the next used to take hours of valuable time, good men and equipment.

Now, it's a matter of minutes. One man can easily elevate a 60' conveyor in 9 minutes with the new Pioneer Hydraulic Conveyor Truck. A twist of a valve, and in 60 seconds the conveyor is back in its cradle... ready for another move.

Low overhangs are no problem for this smooth rolling truck for it's built without masts and requires only 7'3" clearance.

The Pioneer Hydraulic Conveyor Truck handles conveyors up to 60' in length with belts up to 30" wide. Write for complete details today.

**PIONEER ENGINEERING WORKS, INC.**  
1515 CENTRAL AVE. • MINNEAPOLIS 13, MINNESOTA

● A sturdy Blackhawk Pump boosts the conveyor into exact feeding position. Once spotted, it's locked securely in place. A low center of gravity, 8' tread, and pneumatic tires add to portability.

BUY BOTH-

Higher Output,  
Lower Upkeep!

# Pioneer

Continuflow EQUIPMENT







C. & E. M. Photo  
Victor Smith, Office Manager, confers with big Project Manager Frank P. Llewellyn (6 feet 7½ inches tall, 260 pounds) on the Thygesen-Llewellyn job near Alamogordo, N. Mex.

## Roadbed and Tunnel Blasted in Mountain

(Continued from preceding page)

2½-yard rig and four passes by the 1½-yard shovel. The Northwest 2½-yard shovel had seen a great deal of service prior to this job, and its output did not satisfy Thygesen and Llewellyn. A Murphy diesel engine was brought in, arrived about the time of this interview for CONTRACTORS AND ENGINEERS MONTHLY, and was installed at once.

The two shovels loaded out an average of 2,000 cubic yards of blasted rock per 8-hour day between them, according to Tony Llewellyn. Installation of the new Murphy diesel was expected to give the larger shovel more bail-pull power; it would probably boost that figure, Tony believed.

Rock fills were made wherever possible in horizontal lifts, and rolled by the Dumpsters and a bulldozer which kept the fill dressed. But in a few places the only way to start a fill was for one of the new Caterpillar D8's, with its Caterpillar blade controlled by a Caterpillar power-control unit, to push material off the edge until some semblance of working room could be cleared.

The rock-excavating equipment was used against the full 20-foot face left behind the drills. And after the rock was removed, the drills went back to work until a cut had been benched in to grade. It was a slow, delicate process, and the moving of equipment between cuts was something that Tony Llewellyn did with the astute study of a chess player, so that the resulting excavated rock rolled the job towards completion as speedily as possible.

### Tunneling Methods

When the job was visited, one of the Northwest shovels was about halfway finished with the facing-off process at the west portal. The job was advanced to the point where decisions as to methods of tunneling had been made, tentatively at least.

The tunnel rises on a 4 per cent slope from the starting portal, and Tony expected to hole through in about eighty 5-foot rounds. There were about 11,500 cubic yards to remove in the main 30 x 22-foot bore.

First of all a pilot cut 6 x 7 feet was blasted through the mountain. That fully determined the formation. Upon that determination rested the decision of whether to dig the upper tunnel arch on a radius of 16 feet 3 inches or 18 feet 3 inches to accommodate a timber lining.

For this first pilot bore Tony used Gardner-Denver 3½-inch automatic liners, a Gardner-Denver mucking machine, four 16.2-cubic-foot tippie cars, and the compressor equipment used on the drilling job. A Caterpillar D3400 diesel electric generating set was used

to furnish 15 kilowatts of energy to a blower. After the pilot bore was through, Tony put an airplane blower at the east portal and kept the main tunnel continuously ventilated.

A Gardner-Denver pneumatic liner was ordered as a fast, easily-set-up protection for drillers on the pilot cut.

Drilling the main rounds was done by six Gardner-Denver drills mounted on a jumbo. While the drilling of cut, rib, arch, and lifter holes conformed pretty much to standard practice, loading had to be rather light for tunnel work to keep from overbreaking beyond the tunnel neat lines. A ¾-cubic-yard Koehring shovel with a tunnel boom and stick was also ordered.

Hauling material from the tunnel was merely a problem of letting the cars coast down the 4 per cent grade to the dump ground, and pulling them back with an air hoist. Not enough yardage was involved to justify the expense of an electric locomotive.

After the main tunnel had been blasted, it was then used as a haul



C. & E. M. Photo

A general view of the camp on the Thygesen-Llewellyn \$640,100 contract shows equipment stored, gas pumps, the office, and the equipment-repair shop.

road for some excavation on the other side of the mountain; the entire job was fully balanced between cut and fill for 471,000 cubic yards.

### Safety Features

The entire job was conducted through its most dangerous pioneering phase

with no serious accidents to personnel. With snow and ice on the access roads, the only casualties to equipment were a Dumptor, later salvaged, and a truck which tumbled a terrifying 500 feet to the bottom of a gorge for almost a total loss.

(Concluded on next page, Col. 3)

## Portable ONE MAN machines for Heavy Construction

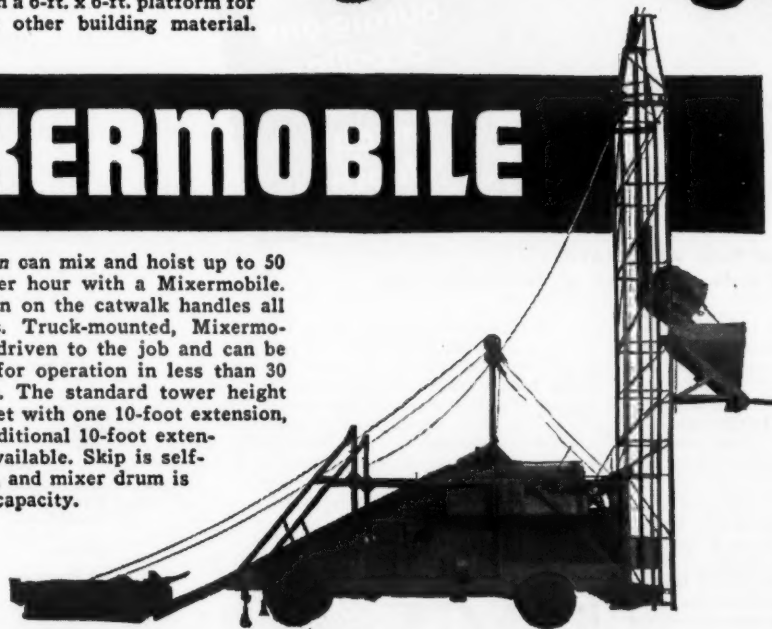
# TOWERMOBILE

Hoisting your concrete for high pours is no problem if you have a TOWERMOBILE. Saves all the preparation and last minute rush of rigging up a hoist or runways to get the concrete up to the pour. One man drives it to the job, sets up for operation in 15 to 30 minutes, and hoists and pours concrete up to 50 yards per hour. Tower is raised or lowered mechanically. Standard tower height is 45 feet. Elevating bucket is interchangeable with a 6-ft. x 6-ft. platform for hoisting other building material.



# MIXERMOBILE

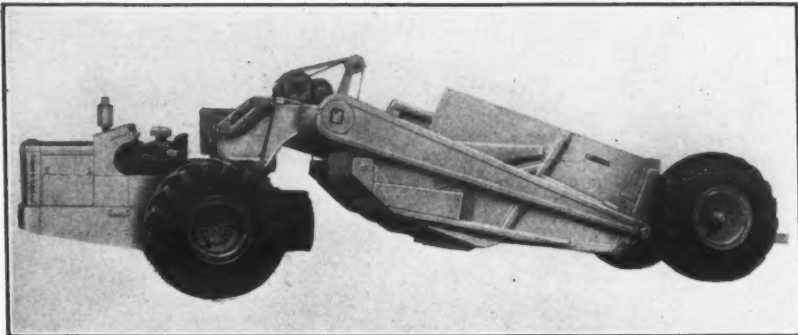
One man can mix and hoist up to 50 yards per hour with a Mixermobile. One man on the catwalk handles all controls. Truck-mounted, Mixermobile is driven to the job and can be set up for operation in less than 30 minutes. The standard tower height is 35 feet with one 10-foot extension, with additional 10-foot extensions available. Skip is self-loading, and mixer drum is 2-yard capacity.



## MIXERMOBILE MANUFACTURERS

6855 N.E. HALSEY STREET ✕ PORTLAND 16, OREGON

WRITE  
to Dep't CE for  
complete  
information and  
name of your  
nearest dealer.



The new 35-ton Tournapull features electric control, Tournamatic constant-mesh transmission, and Tournamatic differential. It can be used with E-35 or E-25 Carryalls. It has four speeds forward and two reverse, and travels up to 15 mph.

## Big Earth-Mover Is Electric-Controlled

A new 35-ton-capacity Tournapull has been added to its line by R. G. Le-Tourneau, Inc., Peoria, Ill. New developments in the design of the Model B are electric control, Tournamatic constant-mesh transmission, and Tournamatic differential.

Powered by a 225-hp diesel engine, it has four speeds forward and two reverse, and travels up to 15 mph. It can be used with the E-35 Carryall, having a 35-ton (26.1-yard struck) capacity, or the 25-ton E-25 Carryall (16.5 yards, struck capacity).

Tournapull steering, Carryall bowl, apron, and tail gate are all controlled by individual Tournatorque electric motors. These motors are ac but are said to have the lugging characteristics of dc motors. Tournapull and scraper operations are controlled by buttons on the dashboard.

Tournamatic transmission does away with a foot clutch; non-stop speed selection is obtained by moving levers

to the desired gear ratio, the manufacturer explains. Power steering enables the operator to lock the Tournapull and Carryall into a single unit. Selective two-speed steering is said to give fast control in tough going and slow steering for fast hauling speeds.

The Tournamatic differential is designed to supply the most power to the drive wheel having the firmest footing. It is said that this prevents either wheel from spinning independently of the other. Tapered bead tires are used to allow the tire to seat itself firmly against the wheel rim at low air pressures.

Overall specifications of the new Tournapull Model B with the E-35 Carryall are: length 37 feet 6 inches; height 11 feet 3 inches; width 11 feet 7 inches; wheelbase 23 feet 8½ inches; minimum turning radius 33 feet; and empty weight 20¼ tons. The unit can make a 90-degree turn in either direction.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 16.

## Roadbed and Tunnel Blasted in Mountain

(Continued from preceding page)

But Big Tony and Superintendent Tom Mann are constantly cautioning their crews to operate carefully, even if it means doing a thing a little more slowly.

"That snow on those loose rocks is slippery," they would say to a jackhammer man lugging his drill up the slope. "Watch your step, boy."

Or, "Be sure to check and make certain yourself that everybody's in the clear before you pull that blast," to the head powderman.

### Personnel

The job, known officially as Project 35-D&E, New Mexico Forest Highway System, was planned and directed by B. W. Matteson, Division Engineer of the Public Roads Administration, with offices in Denver. Jesse E. Williams is the New Mexico District Engi-

neer, with headquarters at Santa Fe. A. O. Stinson was the Resident Engineer.

On the contractor's side, both Henry Thygesen and Frank P. Llewellyn were active partners, though Big Tony did most of the active supervision. He has been a contractor in Alamogordo for several years and did much of the construction work at the Alamogordo Air Base during the war.

Tom Mann was Superintendent, Frank Danley was Master Mechanic, and Victor Smith, Office Manager.

### Heil Sales Appointments

The appointment of Walter "Mike" Carlson as Assistant Sales Manager of its truck body and hoist division has been announced by The Heil Co., Milwaukee.

Announced at the same time is the appointment of John Zimmerman as sales representative for the states of Wisconsin, Michigan, Illinois, Indiana, Ohio, and Kentucky.

# GUARANTEED



... to outdig any dragline bucket at any depth!

When properly used Page AUTOMATIC Buckets will outdig ordinary buckets of comparable size.

That's a guarantee you can easily prove for yourself by a competitive test. Compare the production of your present bucket with that of an AUTOMATIC. Hundreds of dragline operators in all kinds of digging have found that their AUTOMATIC buckets dig more yards at a lower cost per yard than any other dragline bucket they have ever used.

Here's why: Page AUTOMATICs dig right in at the first pull on the load line and get a full pay load within one to three bucket lengths regardless of the depth — 20 ft., 100 ft. or more. This means that most of your operations are under or near the end of the boom point where the minimum amount

**PAGE ENGINEERING COMPANY**  
Clearing Post Office • Chicago 38, Illinois

of power is required for hoisting the load. Perfect balance of the AUTOMATIC assures perfect control whether loading or dumping. Quick loading features of AUTOMATIC buckets mean less wear and maintenance on the bucket, cables and the dragline as well as minimum operator fatigue. For more complete details, see your own construction equipment distributor or write for new booklet "How to Get the Most Out of Your Page Automatic Dragline Bucket."

**PAGE** Automatic  
DRAGLINE BUCKETS and  
WALKING DRAGLINES



★ Need information on steel forms, bins, mixing plants, batchers, or other Heltzel products? See a Heltzel distributor. There's one near you. He can give you fast, complete service on your requirements.

If you prefer, mail the coupon direct to us. We will send you by return mail, descriptive engineering bulletins on products in which you are interested plus the name of the Heltzel distributor nearest you.

Service and quality—that's our business.

FOR QUICK SERVICE—MAIL COUPON TODAY

Heltzel Steel Form & Iron Company, Warren, Ohio

Send me the following:

☐ B-19 Steel Highway and Airport Forms

☐ B-19A Steel Dual Duty Airport Forms

☐ A-20 Steel Forms for Curbs or Curb and Gutters or Sidewalks.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

(Type of construction usually engaged in)

**HELTZEL** STEEL FORM & IRON CO.  
WARREN, OHIO • U. S. A.

CONCENTRATED  
*Engineering*

IN CONCRETE  
CONSTRUCTION  
EQUIPMENT

BINS, Portable and Stationary  
CEMENT BINS, Portable and Stationary  
CENTRAL MIXING PLANTS  
BATCHERS (for batch trucks or truck mixers with automatic dial or beam scale)  
BITUMINOUS PAVING FORMS  
ROAD FORMS (with lip curb and integral curb attachments)  
CURB FORMS  
CURB AND GUTTER FORMS  
SIDEWALK FORMS  
SEWER AND TUNNEL FORMS  
CONCRETE BUCKETS  
SUBGRADE TESTERS  
SUBGRADE PLANERS  
TOOL BOXES  
FINISHING TOOLS FOR CONCRETE ROADS



# Unwatering, Underpinning Lick Foundation Problems

## High Water Table in Sand, And Structures Close By, Call for Wellpoints and Special Underpinning

THE Times-Union, a Jacksonville, Fla., newspaper, recently decided to expand its present plant at the southwest corner of West Adams and Pearl Streets. Adjoining property extending from West Adams south to Forsyth Street was therefore acquired for the new addition. At once two problems confronted the builder.

Problem No. 1 was the removal of ground water. In practically all of Florida the water table is high, and Jacksonville is no exception. At this particular site the sandy soil is saturated with water only 7 feet below ground level. Problem No. 2 was how to construct heavy foundations immediately adjacent to neighboring buildings without disturbing these structures. For they rest on much shallower footings than those on which the new press building is supported.

A system of wellpoints was the answer to the ground-water problem. Ingenious underpinning of existing foundations in adjoining buildings was the answer to the second problem. It permitted the construction of the news-

paper-plant addition with no disturbance to the older surrounding structures.

At present the Times-Union offices are housed in a 4-story corner building, 100 x 169 feet, with a one-story adjoining wing which abuts it on the west. The western half of this wing, about 52 feet square, remains as it is for storing ink and the great rolls of newsprint. The other half has been removed to make room for the new two-story addition which will be 56 feet wide and extend south over the acquired property to front on Forsyth Street. The latter street is skewed with Pearl, thus giving the new building different side dimensions: 148 feet on the east and 162 feet 8 inches on the west. The building will have a structural-steel framework with side walls of reinforced concrete.

Work on the new addition got under way last November, after the site was razed. At that time the George D. Auchter Co. of Jacksonville started foundation excavation. The building is expected to be ready for occupancy by September and will cost approximately \$300,000.

### Wellpoints Needed

Excavation had barely started when free-flowing water-saturated sand was encountered. It quickly bogged down

and finally stopped operations. Foundations could not be built under such conditions. So the contractor rented a Griffin wellpoint system and installed it over the site, beginning at the Forsyth Street end. As the excavation and foundation work progressed, the pipes were extended to the rear as footing after footing was completed.

About 40 wellpoints, 1½ inches in diameter x 14 feet long, were used at a time. They were jetted into place with water from the city hydrants carried in a 1½-inch hose line. As the deepest foundation footings are 11 feet below ground level, the tips of the wellpoints were a comfortable 2 feet beneath the founding line.

The wellpoints were placed on 6-foot centers about 18 inches off the 6-inch header line to which they were con-

nected by swivel joints. A total of 250 feet of header pipe, laid at ground level, was required. This was hooked up with a Griffin Model 88 wellpoint pump with a capacity of 1,700 gpm, driven by a Le Roi 4-cylinder gas engine. A 6-inch discharge pipe line ran from the pump to empty into a manhole leading to a storm sewer in the adjacent street. The pump maintained an average 20-inch vacuum, drawing a pipe about one-fourth full most of the time. It was kept in operation 24 hours a day for over four months until the foundation was completed.

Thus the heavily soaked sand was unwatered. And the foundation excavation was dug easily by a Bucyrus-Erie 15-B crane with a 30-foot boom and a Kiesler ¾-yard clamshell bucket.

(Continued on next page)

## USE LINNS FOR YOUR IMPOSSIBLE JOBS . . .

For the many jobs where ordinary equipment bogs down and wheels are useless—jobs where it seems impossible to work out any economical solution—consider the fact that LINN Haftraks will carry full loads under conditions where other types of equipment cannot even move. LINN Haftraks have contour traction. The LINN traction unit is flexible, not rigid, and fits itself to the footing to provide maximum traction. It eliminates slipping even over badly broken ground, over rocks, through ice, snow, or up steep grades. Every day throughout the year, the LINN carries its payload. Capacities range from 5 to 50 tons, and all LINNS are adequately powered with either gas or Diesel engines. Bodies available for all types of work, or for mounting of special equipment such as shovels, cranes, oil drilling rigs, pumps or compressor units. For specifications, write to our General Sales Office, 250 W. 57th St., New York 13, N. Y.



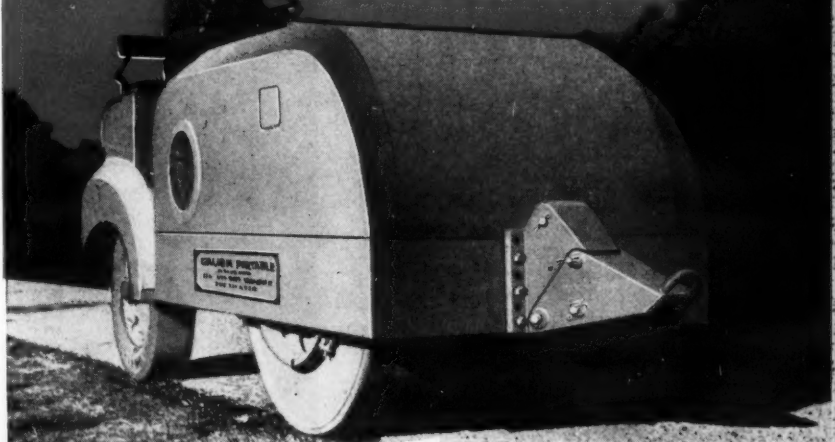
These LINNS at work on a dam project are in so deep that you can barely see their traction units. What other type of haulage equipment could negotiate the steep, soft banks in and out of this hole...with huge payloads?

**THE LINN MANUFACTURING CORPORATION** MORRIS, N. Y.  
*Manufacturers of Haftraks for over 30 Years*

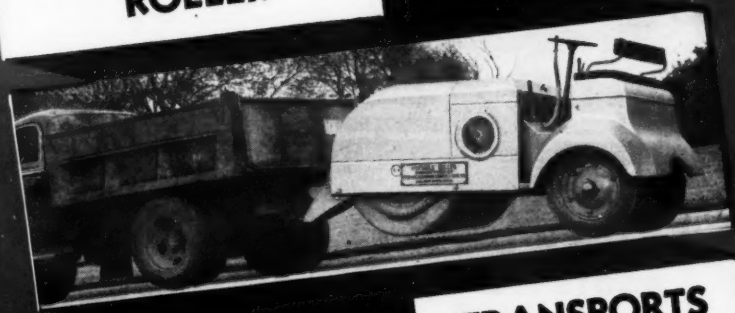


**CONTOUR  
TRACTION**

## GALION VARIABLE WEIGHT PORTABLE ROLLER



### A MULTI-PURPOSE ROLLER



### TRANSPORTS LIKE A TRAILER

Every contractor, highway, street, and airport maintenance department should have a GALION Variable Weight PORTABLE - - the economical roller.

Metal weight of 6,700 lbs. is variable by water ballast to 9,365 lbs. Compression under roll is 183 lbs. per inch with full ballast. Write for Catalog No. 295.

**THE GALION IRON WORKS & MFG. CO.**

General and Export Sales Offices  
Galion, Ohio, U. S. A.

**GALION  
IRON WORKS**

hydraulic  
**GRADERS · ROLLERS**





C. & E. M. Photo  
The Griffin Model 88 wellpoint pump in the foreground was used by George D. Auchter to dewater the site for the Times-Union building addition. The Bucyrus-Erie 15-B crane in the back handled the excavation.

## Foundation

(Continued from preceding page)

Some of the sand, now dry, was left at the site to be used for backfill later on. But most of it was hauled away in three Mack 5-yard trucks to a spoil area 2 miles distant.

### Concrete Foundation Footings

The foundation for the new building consists of 30 concrete footings laid out in three rows of 10 each running lengthwise of the site. The rows are on 27-foot centers and the average spacing of the footings in the rows is 17 feet 4 inches. Varying in size according to the loads they will carry, most of the footings are from 11 to 15 feet square and are 4 feet deep. On top of each footing is a 2-foot-square concrete pedestal on which the structural-steel H columns will rest. Connecting the center footing with the footings on each side are concrete straps, 2 feet 8 inches wide x 3 feet deep; these act as counterweights to the outer row of footings built along the adjoining buildings.

The usual procedure in constructing the foundation was to build forms for two footings, the center and one of the sides, together with the connecting strap. These three structures were then poured as a unit. Tongue-and-groove wooden sheet piling, consisting of 3 x 8's

12 feet long, was driven on the line of the concrete pour to enclose that much

of the work. A Boyer No. 90 air hammer powered by a Chicago Pneumatic 210-cfm compressor did the driving. The wooden planks were well oiled to permit easy extraction for re-use on the next set of forms.

Within the cofferdam the remaining form work needed for the footing sides and connecting strap was constructed from either 2 x 8's or 2 x 6's backed with 2 x 4 studs on 2-foot centers, with other 2 x 4's at the same spacing for walers. At the bottom corners 2 x 4 kickers ran back to the sheeting for further bracing. The sheeting was braced with one or two horizontal 8 x 8's as rangers, with 8 x 8 cross bracing set on 10-foot centers.

Truck-mixed concrete was supplied by the Ingram Concrete Co. of Jacksonville for the foundation pours. Three Smith 5-yard mixers mounted on Mack trucks hauled the concrete 2 miles from the plant to the job site. A gate in the fence on the Forsyth Street side admitted the trucks which chuted their contents into a 1/2-yard concrete bucket.

It was conveyed to the forms by the crane. The wellpoint risers were left in place during the pouring operations, but were lifted out by the crane immediately afterwards, before the concrete could set.

### Foundation Underpinning

Adjoining the site on the east is a three-story brick building. It is supported on shallow brick foundation columns extending to a depth of only 2 feet below ground level. Five of these columns at the building line were underpinned while the new concrete spread footings were constructed and a concrete column built up to meet the old brick foundation. Along the existing newspaper building a similar number of columns were underpinned while the new footings were being constructed below. This work was undertaken one column at a time.

The original columns of the press building are 20-inch-square reinforced concrete. They rest on concrete foot-

(Concluded on next page)



## Clean YOUR EQUIPMENT

with

HYPRESSURE  
**Jenny** STEAM  
CLEANER



pits, floors, walls, windows, skylights, etc., 10 times faster than by hand methods.

Hypressure Jenny is compact, portable, safe, easy and economical to use. Ordinary labor can operate it. A full powered model may be had for as little as \$348.00.

Why not put Hypressure Jenny Steam Cleaner to work for you? We'll gladly send you complete details and the address of your nearest dealer. Write today.

## HYPRESSURE JENNY DIVISION

HOMESTEAD VALVE MANUFACTURING CO.

P. O. BOX 30

CORAOPOLIS, PA.



# Hose

**BOOTS or CLOTHING**

Call **YOUR**  
*Continental*  
**BRANCH**

**Immediate Delivery from Local Stock BRANCHES**

Baltimore, Md.	Indianapolis, Ind.
Boston, Mass.	Kansas City, Mo.
Buffalo, N. Y.	Los Angeles, Calif.
Chicago, Ill.	Memphis, Tenn.
Cincinnati, Ohio	Milwaukee, Wis.
Cleveland, Ohio	New York, N. Y.
Dallas, Texas	Philadelphia, Pa.
Dayton, Ohio	Pittsburgh, Pa.
Detroit, Mich.	St. Louis, Mo.
Hartford, Conn.	San Francisco, Calif.
Syracuse, N. Y.	

**CONTINENTAL RUBBER WORKS**  
1911 PENNSYLVANIA AVE. A.

In less than one minute from a cold start, Hypressure Jenny's blast of steam, hot water and cleaning compound is ready to loosen and flush away instantly, mud, muck, dirt and grease from all types of machinery and equipment. Hypressure Jenny steam cleaning saves time and money, for one man with Hypressure Jenny can do more cleaning in one hour than ten men can accomplish in the same time with gasoline, brush and scraper. And because Hypressure Jenny eliminates the use of inflammable cleaning fluids it is safe, and entails less risk of fire. When used in the shop to clean machinery *before* repair, Hypressure Jenny saves up to 40% of your mechanics' time usually lost wiping oil and grease from tools and equipment.

Hypressure Jenny saves time and money in other ways, too, by cleaning grease and repair





C. & E. M. Photo  
A footing pour is about to be made on the Aughter building-addition job. The 6-inch header pipe for the Griffin well-points, to keep the hole dry for the pour, is at the rear of the excavation.

## Foundation

(Continued from preceding page)

ings 6 x 6 x 3 feet deep. On each side of the column a 24-inch I-beam, 24 feet long, was placed, supported at the ends by timber grillage laid out at ground level. The timber footing consisted of a layer of 12 x 12's, 6 x 8 feet in area, with another layer of 6 x 8 timbers placed on top and crosswise to the bottom layer. The needle beams were on 37-inch centers. They supported a 12 x 12 timber set vertically on each side of the column, and transferring the load from the floor beam above to the steel beams below. Wedges were driven under the timber struts to assure a tight fit.

Once the load was taken off the old footing, the ground was excavated beneath it and the new spread foundation was constructed. Then the old column was carried down to its new foundation. This same principle of load transference by the use of needle beams was used for all the underpinning work.

### Personnel

The construction of the addition to the Florida Times-Union building was supervised by James Monahan, Vice President of the George D. Aughter Co. W. H. Biven was Superintendent. A force of 30 men was employed on the foundation phase of operations, including 15 carpenters, 1 crane operator, 3 on the installation of the wellpoint system, and 11 laborers.

The alterations and addition were designed by Marsh & Saxelbye, Architects, of Jacksonville, with D. L. Mead as Engineer.

### Tools for Aligning Most Connecting Rods

A connecting-rod aligner is made by the K. O. Lee Co., 1104 First Ave., S. E., Aberdeen, S. Dak. The Knock-Out aligner will check and correct bend, twist, and offset without removal of the rod assembly from the aligner.

It is made in three models. The Model C1 will handle rods from 1½ to 2½ inches. Its net weight is 42 pounds. Model C2 has a capacity of 1½ to 3 inches, and weighs 51 pounds. Both of these models are available with a large base, if desired. Model C3 has a capacity of 1½ to 4¼ inches. It has a net weight of 135 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 29.

### Aggregate-Equipment Data

Several bulletins describing its line of aggregate-handling machines and equipment are available from the Rogers Iron Works Co., 3913 Charles Block, Joplin, Mo.

Bulletin No. C-303 is devoted to a discussion of primary and secondary jaw crushers; Bulletin A-200 deals with the Rogers apron feeders; Bulletin RS-400 deals with revolving sizing screens and combination scrubbers and screens; Bulletin H-151 deals with hammermills; Bulletin R-321 with roll crushers; and Bulletin CN-500 describes the line of lattice and channel-frame type of belt conveyors. Also available is a catalog showing pictures of the complete line.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 77.

### Land-Leveling Unit

A trailer-type land leveler is made by the Dawson Mfg. Corp., P. O. Box 110, South Gate, Calif. It is controlled by the tractor operator and is available with either dual tires or steel wheels.

The Pacific Terraplane can be fitted with buckets of 7, 9, 11, 13, or 15-foot cutting widths. Bucket lift is 40 inches, which provides a road clearance of 36



The Pacific Terraplane, a trailer-type land leveler, can be fitted with buckets of 7 to 15-foot cutting widths. The tractor operator controls all field operations.

inches. Frame width is 108 inches overall. The unit is equipped with Timken bearings throughout. Alignment is maintained by 24 points of

frame adjustment.

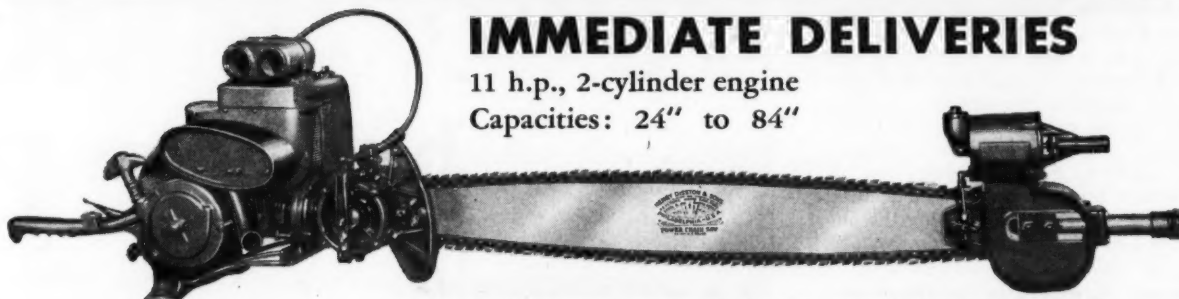
Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 33.

## DISSTON CHAIN SAW

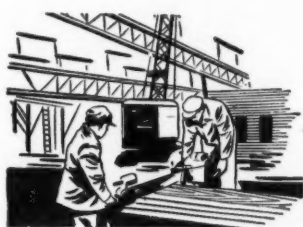
with Mercury Gasoline Engine

### IMMEDIATE DELIVERIES

11 h.p., 2-cylinder engine  
Capacities: 24" to 84"



### SAVES TIME, CUTS COSTS, LIFTS PRODUCTION



The Disston Chain Saw is a self-contained, portable, gasoline powered saw that can be operated in all climates. It is ruggedly built, light in weight, easy to operate and cuts from all angles. It results in greater production and economy wherever heavy timbers are cut . . . in the forests; on railroads and contracting jobs; at shipyards and manufacturing plants of many kinds.

The engine, designed specially for chain

saw operation, has more power per pound of weight than any other chain saw engine. It is manually controlled to utilize full engine power under all cutting conditions. Other features include: die-cast engine cylinders and cooling fan; gear driven magneto; fuel filter built in tank; air filter; positive acting multiple disc clutch; many others. And the tough, durable cutting chain gives perfect contact with drive sprocket under all load conditions.

## DISSTON CHAIN SAW

### PNEUMATIC

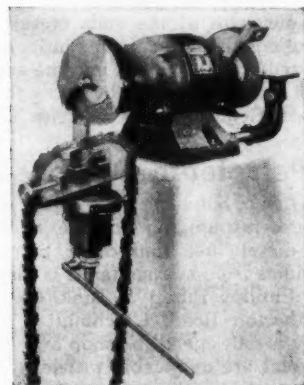


### HUNDREDS OF APPLICATIONS

The Disston Chain Saw—Pneumatic—is a powerful, light weight, air-driven tool that speeds up timber cutting for general contractors, railroads, shipyards. Can be operated wherever compressed air is available, even under water. It requires no previous experience to operate, and is ready for work the instant connection is made with air supply.

3½ and 5 h.p. motors in 24" and 36" sizes. The 3½ h.p. motor requires 90 cu. ft. of air per minute, at 90 lbs. pressure per sq. in.; the 5 h.p., 150 cu. ft. of air per minute at 90 lbs. pressure per sq. in.

Gear housing and saw mechanism may be rotated in either direction—handle grips remain in a horizontal position with relation to each other for any type of cutting. Equipped with heavy-duty, vane-type motor. Tail stock, guide rail and cutting chain are the same as those used on Disston gasoline powered saw. Requires little maintenance for it is built for long, economical service.



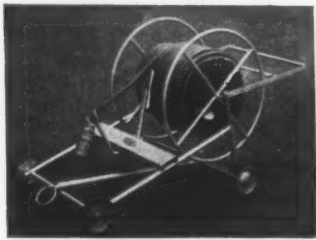
### DISSTON ELECTRIC CHAIN SAW SHARPENER

enables you to do your own sharpening . . . quickly, accurately. Saves time. Keeps chains in first class condition.



Write for further particulars, or see your Disston Distributor, who carries complete stocks of parts and is prepared to render prompt and expert service.

**HENRY DISSTON & SONS, INC., 874 Tacony, Philadelphia 35, Pa., U.S.A.**



The McColpin-Christie self-feeding reel will handle up to 325 feet of 1½-inch-diameter cable.

### Self-Feeding Reel Handles Heavy Cable

A self-feeding reel for handling electric cables, rubber hose, flexible tubing, rope, and similar materials is made by the McColpin-Christie Corp., 4922 So. Figueroa St., Dept. A-17, Los Angeles 37, Calif. The reel is designed for the extension of power outlets and for use on construction jobs, in welding shops, etc.

A female receptacle is mounted in the hub of the reel and a male plug is attached to the free end of the cable. A guide arm on the reel automatically feeds the cable in even layers, says the manufacturer. The reel will handle up to 325 feet of 1½-inch-diameter cable.

The cart is mounted on four wheels. An extendable towing bar lifts the front guiding wheels off the ground when towing. A bar handle mounted on the cart is used for pulling the unit. When lowered, it also acts as a drag on the drum to prevent overrunning which might cause slack in the cable. The cart is provided with a foot-operated brake to prevent sliding.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 12.

### New Hydraulic Press

A 25-ton hydraulic press for pressing, straightening, bending, flattening, broaching, assembling, and other operations is manufactured by the Manco Products Co., State and Hay Sts., York, Pa. Hand-operated, it is self-contained and may be moved about at will.

Distance between uprights is 30 inches; table travel, 35 inches; ram travel, 4½ inches; ram diameter, 2¾ inches; ram travel, ½ inch per stroke; width between table channels, 5½ inches; overall height, 60 inches; floor space, 34 x 27½ inches; and weight with the arbor press is 420 pounds. Handle grips at the ends of the table make possible adjustments in its height.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 90.

### Petroleum Dispenser

A line of hand-operated rotary pumps for use in pumping gasoline, kerosene, oil, diesel fuel, and other petroleum products from storage tanks is made by the Phillips Pump & Tank Co., 5000 Brotherton Road, Cincinnati 9, Ohio. They are designed for shop and garage use and are applicable to use by contractors and state and county highway maintenance departments.

The PW Series is made in four sizes varying in capacity from 7 to 14 gpm. The various types include models with spouts, models equipped with a plunger shut-off nozzle with or without a drain tray, with a spring-type shut-off nozzle, or with a hose and open nozzle.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 42.

### Steel Firm Ups Key Men

Several promotions among its sales personnel have been announced by the Bethlehem Steel Co., Bethlehem, Pa. J. M. Ellis has been appointed Assistant to the Vice President. K. L. Griffith

becomes General Manager of Sales. D. C. Roscoe becomes Assistant General Manager of Sales. A. T. Hunt is named Manager of Sales, sheets and strip. M. C. Schrader is appointed Assistant to the Vice President.

### Heavy-Duty Disk Harrow For Highway Operations

A short history of the plow begins a new catalog of the Rome Plow Co., Cedartown, Ga., maker of the Rome heavy-duty disk plowing harrows. These harrows are said to plow, mulch, and pulverize in one operation. They are applicable to right-of-way maintenance, roadside development, highway and airport-runway stabilization, pulverizing earth dams, maintaining levees, etc.

Catalog No. 45 lists all the models and sizes of harrows. Specifications given are width of cut, number of disks, weight, and drawbar horsepower required for the pulling tractor.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 80.



he knows it is best . . . it's a VICTOR

VICTOR EQUIPMENT COMPANY, 844 FOLSOM STREET, SAN FRANCISCO 7, CALIF.

## "PERFORMANCE has been PERFECT"



Pioneer 20" x 36" Jaw Crusher Model 150 P.R.L.-2036 and Pioneer 22" x 40" Roll Crusher secondary unit Model 2405 powered by a 4-71 and a 6-71 GM Diesel engine respectively.

It takes a lot of power to crush 1000 tons of large rock a day and turn it into sand and gravel.

That's why the National Truck Service of Asheville, N. C., chose GM Diesels when they set up this rock-crushing plant. Tough GM Diesel power gives them production up to 170 tons per hour at a fuel cost of less than 10¢ per ton.

Because GM Diesels are 2-cycle engines, they provide power at every piston downstroke. They are built to "take it" on tough jobs such as this. They are cleanly designed and "easier to get at"

should servicing become necessary. They are compact and easier to install.

All this makes the GM Diesel ideal for all kinds of construction work. If you have a tough, demanding construction job where dependable, low-cost power is a MUST—better get all the facts about these hard-working, husky GM Diesels.

## DETROIT DIESEL ENGINE DIVISION

DETROIT 23, MICH. • SINGLE ENGINES . . . Up to 200 H.P.  
MULTIPLE UNITS . . . Up to 800 H.P.

GENERAL MOTORS

DIESEL BRAVN WITHOUT THE BULK







Left, A. D. Drumm, Jr., owner of the Silver State Construction Co., of Fallon, Nev., a firm handling considerable soil-conservation work in the west. Above, a Caterpillar D8 tractor and 18-yard scraper levels an acre in 5 hours on a 5,000-acre land-leveling project near Lovelock, Nevada.

### Flushing Attachment For Cleaning Engines

A radiator flushing attachment has been added to the line of equipment-cleaning products made by White Engineering & Mfg. Co., Inc., 141 W. Passaic St., Rochelle Park, N. J. The White Radi-Flush uses steam and chemicals for reverse flushing of automobile, truck, and tractor radiators and blocks. The manufacturer states that it can be used for any cleaning purpose which requires flushing.

Radi-Flush employs the steam generated by a vapor steam cleaner, in which the cleaning compound is mixed. The solution of steam and chemicals is reverse-flushed under controlled pressure until the cooling system is clear. The manufacturer claims that only a hot chemically treated solution will dissolve the cooked-on rust and dirt found in partially or completely clogged radiators and motor blocks.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 92.

### Film About Rock Crushing

A film which describes the construction and operation of its 13-ton No. 3030 double-impeller breaker has just been completed for the New Holland Mfg. Co., Mountville, Pa. It is said to combine industrial reporting with an educational study of the mechanization of rock-crushing operations. Also stressed is the importance of stone in our present economy.

The film was produced by Crawford Weaver and is entitled "New Stone Age". It is a 16-mm sound-color production.

### Lubricant-Research Book

A picture story of its research program for developing improved industrial lubricants has just been put out by the Gulf Oil Corp., 3800 Gulf Bldg., Pittsburgh 30, Pa. It is entitled "Better Lubricants for Industry Through Research". Feature of this 24-page book-

let is a panorama of lubricant development ranging from modern techniques of oil discovery through refining, analysis, testing, and the creation of future products.

Photographs are used to show some of the new lubricant-research devices.

These include pilot plants, endurance-testing machines, micro-laboratory equipment, electron microscopes, and spectrometers.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 84.

### Pneumatic-Tire Rollers

Catalogs describing its 10 and 13-wheel smooth-tire compaction rollers are available from the Tampo Mfg. Co., Division of J. E. Ingram Equipment Co., 1146 W. Laurel St., San Antonio 6, Texas. Highlighted features of the Tampo rollers are the oscillating action of the axles, the low center of gravity, and a short turning radius. Complete specifications, including recommended limits of loading, are also listed.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 62.

### New Chicago Sales Office

A new Chicago sales office has been opened by Western Machinery Co. of San Francisco. Located at 6 No. Michigan Ave., it will be under the direction of Robert Bailey, field engineer in charge. It will also offer the services of Western-Knapp Engineering Co., a division of Western Machinery.



## HOW NEW KB INTERNATIONALS ARE Masterfully Specialized to their Jobs

New KB Model Internationals are the finest values in International Truck history. And International values are so outstanding that for 16 years more heavy-duty Internationals have served American commerce and industry than any other make.

But rugged quality is only one reason for International leadership. Another is International's masterful ability to specialize trucks to their jobs.

There are 15 basic KB Internationals. Gross weight ratings range from 4,400 to 35,100 pounds. Ten different engines are used. Axles, transmissions and tandems are available for every requirement.

International specializes its 15 basic KB Models into more than 1,000 different type trucks—a result

of 40 years experience, engineering skill and matchless facilities. *That's fitting the truck to the job!*

Now add this: International can accurately tell every operator just what his maximum loads should be in terms of the exact conditions under which his trucks operate—an exclusive International service that enables the operator to get the most in operating economy, low maintenance costs, and long, trouble-free performance.

For details of new KB Internationals, expertly specialized, see your International Dealer or Branch.

Motor Truck Division

INTERNATIONAL HARVESTER COMPANY  
180 North Michigan Avenue Chicago 1, Illinois

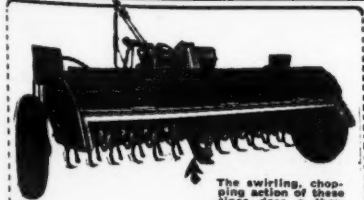


40TH ANNIVERSARY OF INTERNATIONAL TRUCKS  
1907-1947—Forty Years of International Truck  
Service to Industry, Commerce and Agriculture



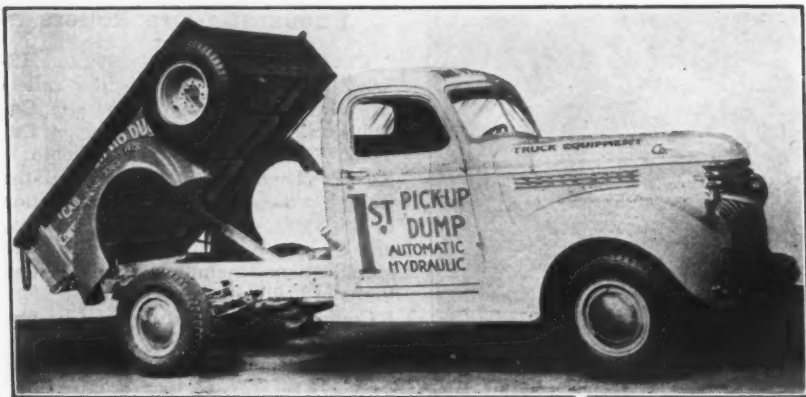
# INTERNATIONAL Trucks

### FOR SECONDARY ROAD CONSTRUCTION... ARIENS AGGMIXER



THE SWIRLING, chopping action of these lines does a thorough job of mixing, wet or dry.

ARIENS COMPANY BRILLIANT WISCONSIN



The Pick-Up Dump features automatic hydraulic cab control. It is available either as a complete unit with dump body, or as a kit for the conversion of most  $\frac{1}{2}$ ,  $\frac{3}{4}$ , or 1-ton pick-up trucks.

### Pick-Up Dump Truck Has Cab-Control Hoist

A dump body for pick-up trucks, with completely automatic hydraulic cab control, has been introduced by the National Truck Equipment Co., 225 Madison St., Waukesha, Wis. The Pick-Up Dump is available either as a complete unit with dump body, or as a kit for the conversion of most  $\frac{1}{2}$ ,  $\frac{3}{4}$ , or 1-ton pick-ups.

The conversion kit includes the hydraulic pump, hoist and sub-frame, hose

and connecting parts, parts necessary to convert the standard tail-gate into a double-acting tail-gate, and the body sub-frame. The hydraulic pump is cab-controlled by a lever mounted on the dashboard. The hydraulic hoist is actuated by the pump which operates off the fan belt.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 41.

### Line of Jacks Described

A line of jacks is described in Catalog No. 302 of The Joyce-Cridland Co., 2027 E. 1st St., Dayton 3, Ohio. Made in screw, lever, or hydraulic styles, they range in capacity from  $1\frac{1}{2}$  to 100 tons. Many of the jacks in the line are described and pictured in the catalog. Specifications listed for them include capacity, weight, height and rise in inches, etc. Prices are given.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 97.



**says Combs Construction Company, Chattanooga,**

**about**

# MICHIGAN

This MICHIGAN owner, in a letter to Nixon Machinery & Supply Co., Chattanooga, goes on to say

"... we have never gone wrong buying equipment that you recommend. Your claims were, if anything, conservative.

"We have used our MICHIGAN as shovel, back hoe, clam, dragline and in steel erection as a crane. In all operations it has proven a very efficient and economical machine. Operating and maintenance costs have been extremely low. Its mobility and flexibility, plus its other features has convinced us that it is an essential part of our equipment fleet.

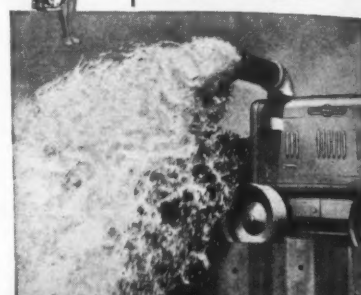
"We recommend the MICHIGAN Model T-6-K, without reservations, for any work within its capacity."

Full details about the complete line of  $\frac{3}{8}$  yd. and  $\frac{1}{2}$  yd. convertible MICHIGAN Mobile SHOVEL-CRANES are available on request.

# MICHIGAN

POWER SHOVEL COMPANY  
BENTON HARBOR, MICHIGAN

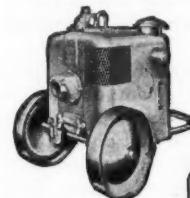
Here's how to handle water—



## JAEGER

enclosed-type pumps give you steady high efficiency — longer life

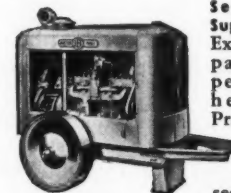
To a better engineered, more amply powered, conservatively rated line of pumps, Jaeger has added all-weather protection of all heavy duty models of 2" to 10" size — for sustained efficiency of pump and engine, extra hours of smooth, dependable performance, plus easy accessibility at all times.



2" and 3" Heavy Duty: Most rugged small pumps built. Conservatively rated @ 10,000 and 20,000 g.p.h.



4" to 10" Portables: Compact, extra powerful units of 40,000 to 240,000 g.p.h. rating and exceptional air capacity.



Self-Priming Super-Jet Pump: Extremely compact, yet outperforms old, heavy types. Pressures to 250 lbs.; 90 h.p. engine. Only 30 seconds to prime @ 20 ft.

Only Jaeger Offers All These Inherent priming action plus "jet" priming — doubly sure and fast ... long-life "Lubri-Seal," accessible for inspection ... self-cleaning shell design ... replaceable liners or seal rings ... Every pump tested and certified for performance.

Sold, Serviced in 128 Cities  
**THE JAEGER MACHINE CO.**  
Main Office, Factory, Columbus 16, Ohio  
8 E. 48th St. 226 N. La Salle St.  
NEW YORK 17, N. Y. CHICAGO 1, ILL.  
235-38 Martin Bldg., BIRMINGHAM 1, ALA.

## KEEP INFORMED—

For further information and literature on products described in this issue, turn to pages 16 and 76 for the Red Request Cards. Our Reader Service Department will be glad to help you.

Contractors and Engineers Monthly

470 Fourth Ave.,

NEW YORK 16, N. Y.



# How Do You Lubricate Your Air Compressor?

**Proper Lubrication Is Good Insurance Against Shut-Downs; Here Are Some Suggestions**

## Part I

♦ THE portable compressor may be intriguing to the sidewalk superintendent, but to the contractor it is the breath of life on the job. Good maintenance procedure is good insurance against unexpected compressor shut-downs. Good lubrication procedure eliminates unwarranted repair.

The portable air compressor is a rugged machine. It is built to operate under all sorts of weather conditions. Since it must operate in far-away places, it cannot be temperamental, and the lubrication system is planned accordingly. Very often the air compressor, the diesel or gasoline-engine drive, and other essential parts are lubricated and maintained in much the same manner as the truck or tractor.

But sometimes operators do not fully appreciate the necessity for positive lubrication and the limitations of mechanical lubricating devices. Appreciation of these factors and a working knowledge of compressor and internal-combustion-engine lubrication requirements is most helpful in reducing operating costs. In the May issue of *Lubrication*, A. F. Brewer and K. L. Hollister, Technical and Research Division, The Texas Co., outlined the essential factors in proper compressor lubrication and care.

The basic machinery in a portable unit involves the air compressor, which may be air-cooled or water-cooled, and the power plant, either a gasoline, diesel, or oil engine.

In the portable compressor, a lot of air power is built into a very compact unit. Certain types are constructed with their cylinders in a straight line. Others, due to space limitations, observe the principles of radial design, using either a "V" arrangement or locating both the high and low-pressure cylinders in the same plane but at different angles to form a "W". In this design the vertical cylinder is the high-pressure element. It is flanked on both sides by the low-pressure cylinders.

A portable compressor must furnish normal-pressure air (up to around 100 pounds of pressure) to one, two, or perhaps a dozen or more high-speed air tools such as rock drills, concrete breakers, riveting guns, chipping hammers, tampers, etc. Two-stage design predominates, with suitable provision for intercooling of the air.

## Cooling

Portable compressors are cooled according to the service for which they are intended and the design involved. Cooling is necessary because when air is compressed, heat is generated. Air-cooling relieves the designing engineer of piping and cylinder-jacketing details. It also eliminates the possibility of freeze-ups in cold localities if a sudden cold wave catches the operator without anti-freeze. On the other hand, air-cooling requires an arrangement of cooling fins around the cylinders for heat radiation.

Both methods of cooling have the same objective: to control the cylinder-wall temperatures so that abnormal over-heating will be prevented. This, in turn, will protect the lubricating film and reduce the power required.

Where cooling is properly maintained, conventional air-compressor oils are used. Where the engine and compressor are built into one unit, however, engine oil is used throughout.

## Service Load

The service load has a lot to do with lubrication. The oil must be capable of meeting the most severe conditions even though the machine may not impose these conditions at all times. To be sure of this, the operator must consider the adaptability of available compressor oils to his particular service and the lubricating systems in his machines.

Conditions which can affect the performance of air-compressor oil and have a bearing on the selection of the type of oil, are: the temperatures and pressures encountered, the amount of condensation occurring, and the metals used.

## Temperature

Air enters a portable compressor at

around the atmospheric temperature. As the piston rises, reducing the cylin-

der volume, the air is compressed. The  
(Continued on next page)

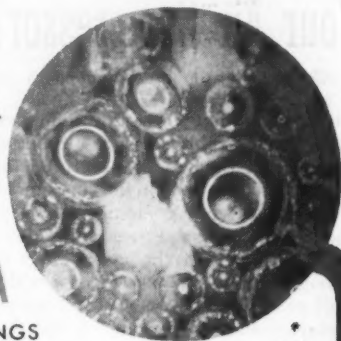
That's  
**DAREX**  
ENTRAINED AIR

**DAREX \* AEA**

ACTS LIKE ROLLER BEARINGS  
TO LUBRICATE THE CONCRETE MIX

Readily Available from Your Distributor

**DEWEY AND ALMY CHEMICAL COMPANY**  
CHICAGO, ILL. CAMBRIDGE, MASS. OAKLAND, CAL.



T. M.  
REG.  
U. S. PAT.  
OFF.

*Built to keep  
"a-running!"*



Have you seen the MultiFoote DuoMix 34-E Paver? If you are planning on new paving equipment be sure you see it and get all the details on this unusual double drum equipment.

It's built to keep a-running! It's powerful! It's simple in design! It's fast!

Lift the doors under the deck. You will be amazed at the small amount of machinery. It means easy upkeep—low-cost maintenance. Unusual crawler design with a self-cleaning type of action gives the MultiFoote low ground bearing pressure and makes it light on its feet.

The rotary transfer and discharge; the big, fast-acting skip; the high-speed bucket with its simple outside door action; mean seconds saved in getting the batch to the grade.

Add to this the power-operated superstructure for low clearance, the high operating platform for clear visibility, the no-pressure water system and other MultiFoote advantages, and you can see why it's the smoothest, fastest Double Drum Paver on the road today. Ask for the latest catalog.

General operating mechanism of the DuoMix. Note the simplicity! Few shafts, few gears mean accessibility, easy adjustment, easy maintenance. The MultiFoote is built to keep a-running.



**THE FOOTE CO., INC.**  
1916 STATE STREET  
NUNDA, N. Y.  
Also see page 82

**MULTIFOOTE**  
*Duomix 34E*  
(DUAL DRUM)  
**CONCRETE PAVERS**

*Builders of*  
Adnun BlackTop Pavers,  
MultiFoote Concrete Pavers,  
and Foote Kinetic Mixers



## How Do You Lubricate Your Air Compressor?

(Continued from preceding page)

air temperature at the end of compression depends on the pressure. In actual practice, the highest temperatures are reached in 100-pound single-stage units. Here, the discharge temperature is about 485 degrees; the average temperature of the air in the cylinder is in the neighborhood of 250 degrees; while the oil which is in contact with a cooled cylinder surface is perhaps at 200 degrees. Most portable compressors, however, are of two-stage design and operate at lower temperatures throughout.

The air leaving the discharge valve remains essentially at the temperature corresponding to the discharge pressure. Therefore, the oil on the discharge valve may be exposed to this temperature for a considerable length of time when the compressor is working hard and not unloading for long periods.

There are several mechanical irregularities which can cause the temperature to go well above the normal discharge temperature. These include:

1. A leaking discharge valve, which permits hot air to re-enter the cylinders and mix with the intake air, and causes a corresponding increase in discharge temperature.
2. Failure of the cooling system.
3. Build-up of carbon restriction in the discharge line; this necessitates an increase in cylinder discharge pressure to deliver the desired receiver pressure.
4. A defective intercooler, which causes one stage to do most of the compression.

Low atmospheric temperatures are sometimes encountered while operating portable air compressors. However, since the compressor is connected to the engine through a clutch, the engine may be started independently. The cold-starting characteristics of air-compressor oil are not too important, especially since the compressor can be run completely unloaded until the oil is flowing freely.

### Pressure

Most portable air compressors are built for pressures between 60 and 100 pounds. For it is in this pressure range that most pneumatic machinery operates. The maximum pressure behind the top piston ring will be about equal to the discharge pressure. Maximum bearing pressures will be four or five times the discharge pressure, but the conditions in a bearing may be much more conducive to the formation of a continuous oil film.

Pressures which the oil film must withstand are very moderate in compressors which are perfectly designed, machined, and properly operated. But conditions not infrequently arise within the compressor, however, which result in an uneven distribution of the bearing or ring pressures. This makes it important to use compressor oils of good quality and of the grade recommended, if wear and scuffing are to be kept to the minimum.

### Moisture

The ratio of actual moisture content to the moisture capacity of air is the relative humidity. Now, the temperature of the air is usually raised on entering a compressor at the beginning of the suction stroke. So while the moisture content remains the same, the potential moisture capacity is increased. Consequently, the relative humidity decreases and condensation does not occur. As air is compressed, the relative humidity would increase if there were no increase in temperature. But actually, the temperature increases as air is compressed. And the net combined effect is a rapid decrease in relative humidity with no possibility of condensation during the compression stroke. Normally, then, there is no condensation in a compressor cylinder during operation.

Condensation does occur, however, in an intercooler or aftercooler. The reason is that there the air remains compressed, and the temperature is lowered until the relative humidity passes 100

### Properties of Lubricating Oils for Air Compressors

	Straight Paraffin Base	Mineral Naphthenic Base	Rust and Oxidation-Inhibited	Compounded	Heavy-Duty Detergent
Gravity	28	20	20	20	28
Flash	440	370	370	375	435
Fire	500	420	420	420	485
Viscosity @ 100	290	330	330	310	300
@ 130	140	140	140	130	140
@ 210	32	47	47	47	51
Viscosity Index	100	0	0	10	85
Pour point	0	-20	-20	-20	-35
Carbon Residue	.15	.04	.04	.05	.35
Neutralization number	.03	.03	.03	.08	.85
Saponification number	.06	.06	.06	6.50	1.60
Ash	None	None	None	None	.25

per cent and the excess moisture is trapped out.

### Lubricating-Oil Properties

There are five types of oils which deserve consideration in a study of air-compressor lubrication: straight naphthenic, straight paraffin, compounded, heavy-duty detergent, and rust and oxidation-inhibited. Identifying tests on typical oils of these classifications are shown in the accompanying table.

Compared to naphthene, the paraffin oils have higher gravity and flash point. Heavy-duty detergent oils have an ap-

preciable ash content from the additives which are used. Oils compounded with a vegetable or animal oil have a comparatively high saponification number. Whether an unknown oil contains a rust and oxidation inhibitor cannot be so readily determined; however, an experimental determination of the anti-rust and oxidation-resistance qualities usually indicates whether or not such additives are present.

### Bearing Lubrication

Portable-compressor bearings are (Continued on next page)

## READ WHY A TRUCK LIKE THIS CAN SAVE YOU MONEY!

This truck—like every Dodge "Job-Rated" truck—is built to fit a specific hauling job.

It's powered with exactly the right one of 7 engines—plus the right gear ratio—to provide the pulling power the job requires, with maximum economy.

It's built with exactly the right clutch, transmission, rear axle—the right units throughout . . . for "top" performance, longer life, and maximum economy . . . on the job for which it was built.

It stands to reason that a truck "Job-Rated" to haul your loads over your roads—will save YOU money!

You can get a truck to fit your job—a truck to give better performance, better service to your customers, and to save you money!

Simply explain your hauling problems in detail to your Dodge dealer. He has the engineering data from which to recommend the best truck investment you can make.

★ ★ ★

Your Dodge dealer is interested in your continued satisfaction: *First*, by selling you a truck that fits your job; *Second*, by giving you dependable Dodge truck service; *Third*, by providing you with truck parts that are identical with original Dodge "Job-Rated" truck parts.

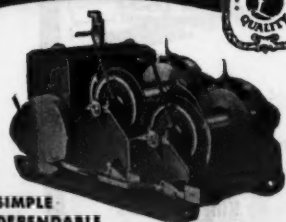


ONLY DODGE BUILDS

**DODGE**  
"Job-Rated" TRUCKS

Fit the Job . . . Last Longer!

### STERLING HOISTS



STERLING MACHINERY CORPORATION  
303 Southwest Blvd., Kansas City



## How Do You Lubricate Your Air Compressor?

(Continued from preceding page)

usually lubricated by force-feed or splash, although other methods are occasionally employed. In the splash system, oil in the crankcase reservoir is splashed by a scoop on the end of a connecting rod onto the bearings and cylinders. The amount of splash can be regulated by varying either the length of the scoop or the oil level.

The oil level should be maintained so that the scoop on the connecting rod dips about  $\frac{1}{4}$  inch into the oil. With the compressor stopped, the oil level should be adjusted to this point and a corresponding mark placed on the oil-level indicator. Usually the indicator already has a mark at about this point.

The oil level should be checked daily and oil added as necessary. Too low an oil level may cause lubrication failure. Too high an oil level may cause foaming or high oil consumption, and result in a dangerous carbon accumulation at the discharge valve. Many compressors employing the splash system are designed so that the oil level which the connecting-rod scoop strikes is automatically kept constant.

In some designs the splashed oil is collected in an upper pocket from which it flows to the bearings. The crankcase is well sealed except for a breather or vent pipe; this prevents build-up of pressure in the crankcase which would tend to cause oil leakage. Air alternately passes in and out through the breather. Therefore, it should be equipped with an air cleaner to keep the dust from getting in, and with baffles to keep entrained oil from getting out. Oil must be prevented from leaking where the crankshaft extends through the crankcase. Here an oil slinger is frequently employed, taking advantage of the centrifugal force to throw oil off the shaft.

In the force-feed system, oil under pressure is forced by an oil pump through passages to the various bearings. The oil drains back to the sump from which it is picked up by the pump and recirculated. When an oil cooler and an oil filter are installed, they are usually on the pressure side of the oil pump. They are fitted with by-pass pipes to prevent stoppage of the oil flow should they become clogged. The system also includes an oil-pressure gage and an oil-pressure relief valve, adjusted to maintain the desired pressure.

Portable-compressor cylinders are lubricated by splash from the crankcase. The cylinder requirements determine the type of oil which should be used in the crankcase. Since most cylinders are lubricated with an oil in the SAE-20-viscosity range, the temperature of the crankcase oil should be accommodated to this grade. This means that the oil temperature should be kept under 160 degrees F to avoid excessive oil consumption.

A large sump increases the life of the oil by keeping the oil temperature down; this gives it a chance to rest instead of being continuously exposed to the oxidizing conditions in the crankcase.

### Cylinder Lubrication

The prime purpose of an oil is to lubricate the bearings and cylinders. Experience has demonstrated that the viscosity of an SAE-20 oil is sufficient to keep the rubbing surfaces separated and piston rings sealed. SAE-10 oils have been used where surfaces are highly polished and tolerance is close. But the 20 grade is better for most units.

The next most important consideration is to use an oil which will not form carbon on discharge valves, since carbon is the primary cause of valve difficulties and may lead to a receiver fire.

It is carbon that holds discharge valves open, causing recompression of hot air and a build-up of the discharge temperature until the kindling point of a dry porous carbon particle is reached. The carbon particle starts glowing, giving off heat which causes other pieces of carbon to smolder. The increasing heat evaporates the oil present in the discharge line. Eventually all the carbon accumulated in the intercooler or air receiver will start burning. The heat generated causes expansion of air in the system. And this air may escape through the safety valve or rupture the system, depending largely on the amount of carbon and oil that has been allowed to accumulate.

This is very unlikely to happen in the modern air compressor, yet it is a point that must not be disregarded entirely. Valves should be cleaned periodically; receivers, intercoolers, and aftercoolers drained regularly; and the right type of oil used.

Even at the moderately low discharge temperature found in low-pressure re-

ciprocating air compressors, any oil remaining as a thin film on the discharge valve will eventually either evaporate or carbonize. A compressor which has been using a heavy paraffin oil which does not evaporate readily will be found to have considerable carbon formation on or adjacent to the discharge valves and a heavy oil film in the discharge passage. On the other hand, a compressor which has been using a light naph-

thenic oil which evaporates cleanly from hot surfaces will be found to have cleaner valves and drier ports.

This narrows the selection of oil for best normal air-compressor service to an SAE-20 naphthenic oil.

The fact that naphthenic oils have low flash points augments rather than detracts from their suitability as air-compressor-cylinder lubricants. The

(Concluded on next page)

## Let HYDRAULICS lift your equipment use the MONARCH

HY-LO-JACK

FAN BELT DRIVEN

POWER HYDRAULIC CONTROL



Lifts equipment ten times faster than hand pump. Easy installation on new or existing equipment. Hundreds of applications, such as Snow Plows, Sweepers, Power Mowers, etc. Priced for the most conservative budget.

WRITE FOR CIRCULAR H-75  
"QUALITY MACHINERY SINCE 1856"

MONARCH ROAD MACHINERY COMPANY. 327-329 Front Ave., N.W., Grand Rapids 4, Michigan

## Get more PRODUCTIVE MAN HOURS with "QUICK-WAY" TRUCK SHOVELS



Shovel, Dragline, Clamshell, Trench-Hoe, Crane or Pile Driver—ALL convertible from ONE basic machine

A "QUICK-WAY" is really SIX pieces of equipment,—because you can convert from one to another in minutes. Because it is so perfectly balanced for truck mounting, a "QUICK-WAY" delivers equally efficient performance any way you use it.

Fast in operation, a "QUICK-WAY" is likewise fast in getting to and from the job—it travels at truck speed on or off the road. "QUICK-WAY" flexibility and quick movement from job to job affords more hours of productive work.

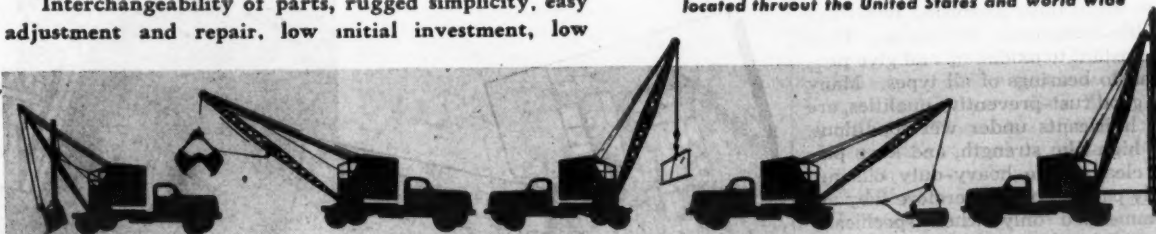
Interchangeability of parts, rugged simplicity, easy adjustment and repair, low initial investment, low

maintenance...all are advantages that make "QUICK-WAY" a profit builder anywhere you put it to work. Regardless of what larger equipment you own, you need "QUICK-WAYS" too. There's a "QUICK-WAY" owner near you; ask HIM.

Model E: 4/10 cu. yd. cap. for mounting on any standard 5-ton truck.

Model J: 1/4 cu. yd. cap. for mounting on any standard 1 1/2-ton truck.

Service available from distributors strategically located throught the United States and world wide



## "QUICK-WAY" TRUCK SHOVEL CO.

DENVER, COLORADO

First to build power shovels for truck mounting; still the leader after 28 years



## How Do You Lubricate Your Air Compressor?

(Continued from preceding page)

flash point is a measure of the volatility of an oil. A volatile oil which will evaporate cleanly from hot discharge valves is required in an air compressor. Volatilization from the cylinder walls is a minor factor, since most of the oil reaches the valves by the combination of mechanical and air pressure.

Flash point is determined by applying a test flame to the vapors above the oil surface in a test cup. In an air compressor, where there is no flame, it is the autoignition or kindling temperature rather than the flash point that measures the ignitability of the lubricant inside the air compressor. It is of interest that the well refined naphthenic-base oils for air-compressor cylinders have autoignition temperatures higher than corresponding paraffinic oils, and well above the air-discharge temperatures.

### Effect of Pressure

The influence of pressure on compressor lubrication is also important, because just before metal-to-metal contact occurs in bearings or piston rings, local high-spot pressures of thousands of pounds may exist. Under such critical conditions, the fact that naphthenic oils increase more in viscosity at high pressure than paraffin oils makes the naphthenic oil preferred.

### Condensation

A factor which influences the selection of lubricating oil is the amount of moisture from condensation that may occur. Except where operating conditions are unusual, condensation occurs in an air compressor only in the inter-cooler, aftercooler, or distribution system. The formation of rust on these elements has been considered a necessary evil. If it is desired, however, to minimize this rust formation, an SAE-20 naphthenic rust and oxidation-inhibited oil is recommended. Such an oil is also recommended for air compressors which stand idle for long periods in humid climates.

The other desirable properties of lubricating oils—such as ease of separation from water, freedom from foaming, non-corrosiveness to bearings, stability after long-time storage, and satisfactory general lubrication—must of course be exhibited by these oils which are now not only inhibited against fresh water but also against salt water. This protection from rust is explained by the fact that the inhibitors plate out in minute quantities on interior parts, protecting them from the rusting action of moisture and air.

Numerous air-compressor tests show that suitably inhibited oils give adequate rust protection and at the same time improve the performance of the oil in other respects. They are most resistant to oxidation, foaming, bearing corrosion, and wear.

### Heavy-Duty Oils

Many heavy-duty oils have qualities which make them promising two-stage portable-compressor lubricants. They are resistant to oxidation, and give protection to bearings of all types. Many have good rust-preventive qualities, are good lubricants under wet conditions, have high film strength, and keep pistons clean. The heavy-duty oils are mostly paraffin base; therefore they are recommended only when specifically approved by the manufacturer for single-stage compressors operating at over 60-pound pressure. At higher discharge temperatures, naphthenic oils should be used to insure clean discharge valves.

About the only time a compounded

fatty-oil lubricant is needed in portable-air-compressor service is when cylinder wear is occurring due to carry-over of condensate from the intercooler. Under such conditions, compounded oils emulsify with the water to maintain a suitable oil film.

Recommendations for the proper lubrication of portable-air-compressor engines will be given in the concluding part of this article in our next issue.

## New Trucks Feature Safety and Comfort

Driver comfort and safety have been given first consideration in engineering its new Advance-Design line of trucks and commercial cars, announces the

Chevrolet Motor Division of General Motors Corp., General Motors Building, Detroit 2, Mich:

The cabs are 8 inches wider and 7 inches longer than previous models. Completely welded, the cabs are stronger and their three-point type of suspension is designed to add to riding comfort. Windshields and windows are larger. The adjustable seat moves on an inclined plane to provide maximum vision for the driver.

Gross vehicle weights range from 2 to 8 tons. The trucks are powered by Thrift-Master or Load-Master engines. The line has a variety of models on nine wheelbases.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 5.

## Data Cover Track Jacks

A descriptive bulletin on its Type-A Simplex track (or trip) jacks has been issued by Templeton, Kenly & Co., 1006 So. Central Ave., Chicago 44, Ill. The Type-A jack is designed to facilitate rail maintenance.

The center spread of Bulletin T & B-47 describes in detail the various new improvements added and features retained in this single-acting track (or trip) jack. Listed on the back page is a selection of single-acting jacks, bridge jacks, journal jacks, and push-and-pull jacks. Specification charts on all these Simplex jacks are included.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 60.

# Truer Words Were Never Spoken— Mr. Winkelman

EXCERPT FROM A PAPER GIVEN  
BEFORE THE ASSOCIATION OF  
HIGHWAY OFFICIALS OF THE  
NORTH ATLANTIC STATES,  
ATLANTIC CITY, FEB. 27, 1947

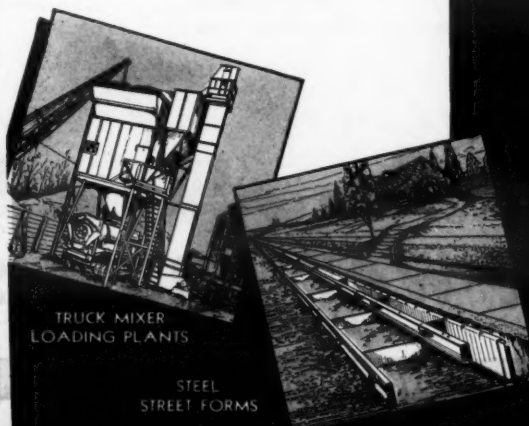
## The Best Concrete Paving ... with the Fewest Men ... at Lowest Cost ... in the Quickest Time

can be done if the job is thoroughly mechanized by Blaw-Knox... the contractor's only single source for a complete outfit of job-tested—*tried and true*—concrete paving machinery.

Now, when bids are submitted with your fingers crossed—the efficiency that Blaw-Knox builds into its machines *really pays off* for the contractor.

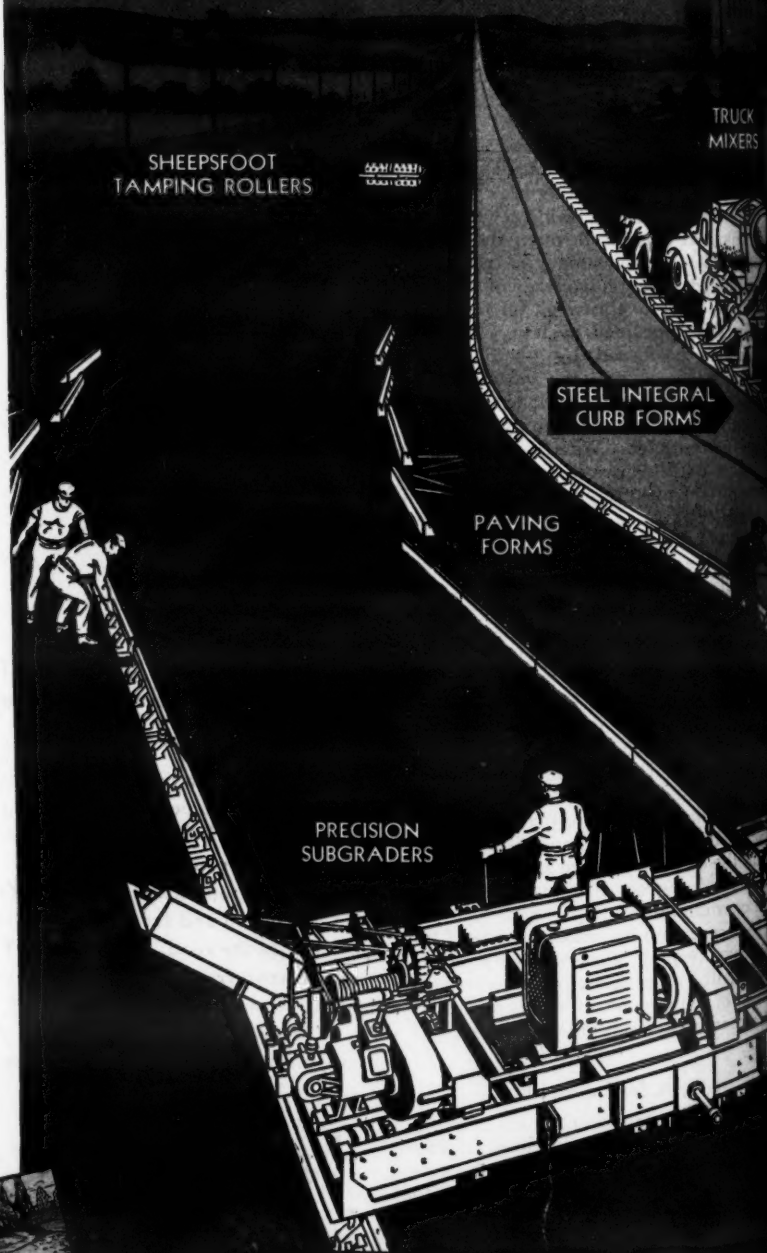
**BLAW-KNOX DIVISION**  
of Blaw-Knox Company  
2067 Farmers Bank Building,  
Pittsburgh 22, Pa.

See your Nearest  
Blaw-Knox Distributor.



TRUCK MIXER  
LOADING PLANTS

STEEL  
STREET FORMS



SHEEPSFOOT  
TAMPING ROLLERS

CONCRETE  
CURB FORMS

STEEL INTEGRAL  
CURB FORMS

PAVING  
FORMS

PRECISION  
SUBGRADERS

# BLAW-KNOX

Time and Labor Savings



## Platform Trailer Has Cantilevered Framing

A series of platform trailers featuring a cantilevered type of frame construction is made by The Trailmobile Co., 31st and Robertson, Cincinnati 9, Ohio. The main frame rails have a depth of 15 inches and are made of high-tensile steel. Cross-members and outriggers are spaced every 18 inches along the length of the trailer to support concentrated loads. Rated capacities of the three models are 3, 6, and 9 tons; maximum payloads are 7.5, 11.8, and 14 tons. The platform lengths vary from 22 feet to 34 feet; width of platform is 90 inches, overall width is 95½ inches; and flooring is made of 1½-inch laminated oak. Tire sizes used are 8:25 x 20, 9:00

x 20, and 10:00 x 20. Vacuum operated brakes are standard equipment, with air brakes optional.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 2.

## Acetylene-Generator Data

A 24-page catalog listing the complete line of Airco acetylene generators has been made available by the Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y. Stationary generators covered are the 300-pound single and double-rated and the 500-pound double-rated. Also described are the portable generators ranging in size from 15 to 50 pounds.

Other pieces of equipment discussed

are the simplex and duplex-type oxygen manifolds, stationary-type acetylene manifolds, duplex-type manifolds for hydrogen and other gases, and portable manifolds for both oxygen and acetylene.

Featured in Catalog No. ADC 636 are diagrams of typical manifold installations.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 83.

## Cement-Firm Appointment

Fred L. Wagner has been appointed Assistant Sales Manager for the Pittsburgh sales area of the Universal Atlas Cement Co., a United States Steel Corp. subsidiary.

## Highway Revenue Act Is Passed by California

**Solons Boost the Gasoline Tax and Trucking Fees After Bitter Fight In the State Legislature**

THE California Assembly, by a vote of 53 to 24, passed the Burns Highway Bill on June 20. So ended a bitter six-month fight waged since January by state legislators in Sacramento.

The bill carries an increase of 1½ cents a gallon in gasoline and diesel-fuel taxes; license-plate fees are raised from \$3 to \$6 per year; a driver's license will cost \$2 for four years; and all trucks will be taxed on a graduated scale based on unladen weight, with a 3 per cent gross-receipts tax retained on for-hire trucks.

The truck tax schedule is in two parts: (1) trucks with two axles and (2) trucks with three or more axles.

The tax will range in two-axle class from \$10 a year for trucks from 3,000 to 4,000 pounds unladen weight, up to \$120 a year for trucks 14,001 pounds and over. For three-axle trucks it ranges from \$8 for trucks 2,000 to 3,000 pounds, to \$200 a year for trucks 15,001 pounds and over. All fees and taxes are collectible beginning next July 1.

It is estimated that the bill will produce \$64,000,000 a year in new money for highway construction. Of that sum, \$18,750,000 will go to cities and counties and \$45,250,000 to the state. Construction money the state has out of present revenues is \$27,000,000 a year; its total construction money, new and old, will be about \$72,250,000 a year.

There are 67.4 miles of metropolitan freeways on the bill. All money allotted to a county cannot be spent on freeways, but the provisions are such that a substantial portion can be spent on them, with restrictions to protect other highway needs.

The bill calls for a general allocation of highway funds of the state on the basis of 55 per cent to the south and 45 to the north, the reverse of the present practice. The Mayo amendment, put in for protection to counties, guarantees that each county will get a certain amount of highway construction work in each five-year period.

## Action Comes After Battle

Passage of the bill ended a bitter legislative battle, waged since January on the measure. For months the issue remained in doubt. Chief opponents of the measure, according to Governor Earl Warren of California, were trucking interests and the oil industry.

The new bill in general follows certain long-range recommendations as set forth in the Collier Committee report. Under the chairmanship of Senator Randolph Collier, a ten-year construction program was planned for the state, considered from a statewide viewpoint. It was compiled in an impressive report and submitted to the California lawmakers.

A special session of the Legislature was called in January to consider the highway measure.

"I have called you into extraordinary session for the purpose of considering measures to bring our highways up to date and to make their use safe for our people," Governor Earl Warren began grimly. "Thousands of lives are being lost, thousands of people are being injured, and the development of our state is being retarded because we are trying to take care of the automotive needs of 9,000,000 people on an outgrown highway system. . . .

"There was a time when California had the outstanding highways in the nation, but they have failed to keep abreast of population growths and

(Concluded on next page)

"One of the methods by which contractors can cut highway construction costs is through the use of machinery which increases the productivity of workmen."



**DWIGHT W. WINKELMAN**  
President, D. W. Winkelmann  
Syracuse, N. Y., and Vice  
President, Associated General  
Contractors of America, Inc.

PORTABLE BULK  
CEMENT PLANTS

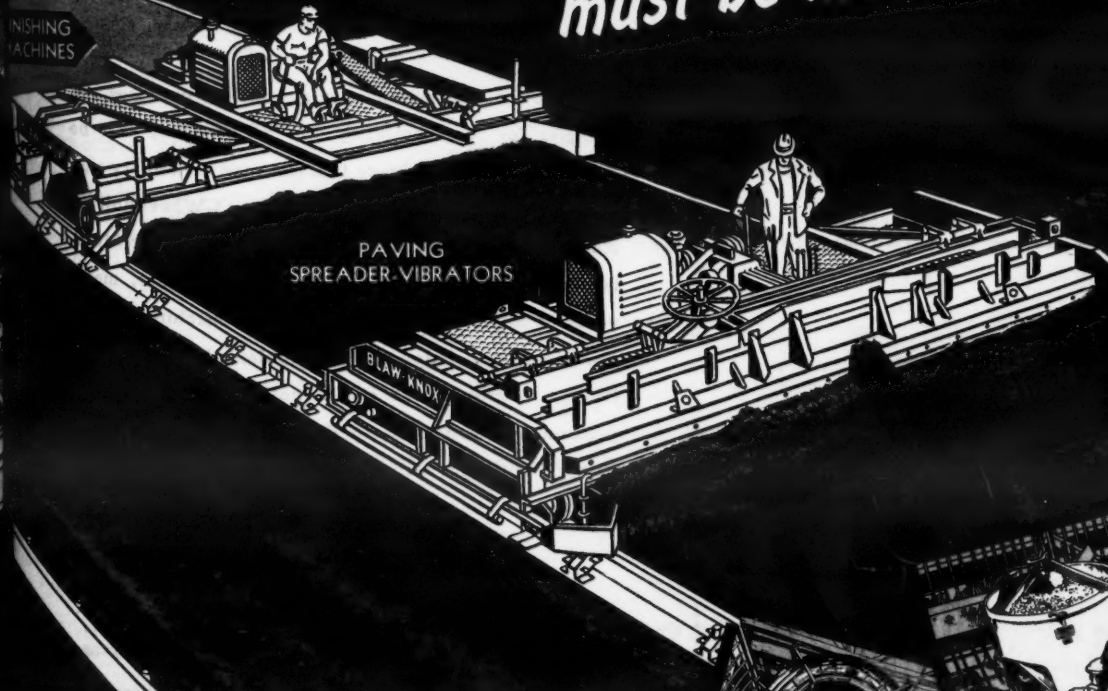


CLAMSHELL  
BUCKETS



PORTABLE AGGREGATE  
BATCHING PLANTS

*Concrete Paving  
must be mechanized*



PAVING  
SPREADER-VIBRATORS

CONCRETE  
BUCKETS

STEEL FORMS FOR  
CONCRETE CONSTRUCTION

**W. K. NOX**

CONSTRUCTION EQUIPMENT



## Highway Revenue Act Is Passed by California

(Continued from preceding page)

transportation demands. Their inadequacy today is apparent to everyone—and in tragic terms."

Governor Warren said that one of the chief reasons for demanding immediate action was the mounting fatality and injury rate on the state highway system. Traffic accidents in 1946 killed 41 and injured 851 of every 100,000 persons in the state, he declared. Without a final report, he estimated that 3,800 people met violent death and approximately 80,000 were injured on the state's roads last year.

"It is my belief that the state's finances are badly out of balance between needs and revenues," Warren added. "And they are getting worse all the time."

He announced that in preparing the budget for the coming fiscal year, it was necessary to defer some \$40,000,000 in urgently needed work because the necessary funds were not available, even though the plans were ready and the projects approved by the State Highway Commission.

### Many State Roads Obsolete

Of the 13,086 miles of highways in California, there are 5,000 miles of two-lane roads less than 20 feet wide. About 360 miles are three-lane types.

"The two-lane roads are bottlenecks and the three-lane highways are death traps," Warren warned. He cited the desperate need for at least 2,500 miles of divided highways to protect lives and to eliminate congestion.

### California's Growth Amazing

Statistics cited by Governor Warren on the state's need for remedial action were impressive. The state's population has increased by more than 2,000,000 since the start of World War II. California has 2,800,000 passenger cars registered, or one for every 2.5 persons as against a national average of 4.1 persons. California's 300,000 trucks carry loads larger by 44 per cent than the national average. The state operates 3,100 school buses involving the safety of 100,000 children. Thousands of commercial buses carry millions of passengers daily.

The new highway bill, it is believed by key highway engineers within the state, will adequately solve that problem over the next ten-year period.

### Material-Testing Machines

Equipment for tensile or compressive testing of materials is described in bulletins of the Riehle Testing Machines Division of American Machine & Metals, Inc., East Moline, Ill. It includes machines for testing cement briquette specimens and hydraulic compression-testing machines.

Described in the bulletins are the ranges of the machines, the methods of applying loads, specifications and dimensions, etc. Feature of the compression tester is a pacing disk said to permit regulation of the load steplessly within wide limits. The briquette machine is made in two styles: the shot-type machine or the automatic motor-driven machine.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 75.

### Cummins Staff Changes

Several personnel changes have been announced by the Cummins Engine Co. Inc., of Columbus, Indiana. R. E. Huthsteiner, Vice President and General Manager, was elected a Director. Edwin G. Crouch was elected Secre-

tary. Waldo M. Harrison was elected Treasurer, and will continue as Controller. H. L. Knudsen resigned as Vice President of Engineering, but will continue as a Director of the company. D. J. Cummings was promoted to Manager of Engineering and Quality. W. J. Manning was promoted to Assistant Controller.

### Contractors' Wheelbarrows

A folder describing the General contractors' wheelbarrow is now available from the General Wheelbarrow Co., Inc., 700 E. 10th, P. O. Box 528, Wichita 1, Kans. These barrows are adapted to either dirt or concrete, wet or dry material.

Models in Series A have maximum capacities of 4, 4½, 5, and 6 cubic feet. Weights, dimensions, and type of steel and construction used are described in the folder.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 52.



CHOOSE THE SIZE THAT SUITS YOU BEST!

**MANGANAL**

TRADE MARK REG. U.S. PAT. OFFICE

11% to 13½% MANGANESE NICKEL STEEL  
**WEDGE BARS**

They come in 22 sizes (8 of them now rolled manganese nickel steel)—and there's a size for every shovel or dipper tooth in your equipment. Repointing teeth is easier, faster and more economical when you use MANGANAL. For extra wear, use a Seaco overlay. It lets MANGANAL work-harder!

NAME OF NEAREST DISTRIBUTOR  
UPON REQUEST

FREE for the ASKING  
Our Booklet "The  
Welding of 11% to  
14% Manganese  
Steel."

**STULZ-SICKLES CO.**

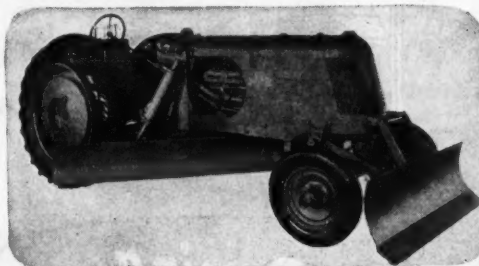
Sole Producers

91 N. J. Railroad Avenue,

NEWARK 5, N. J.



**EVERYWHERE YOU GO**



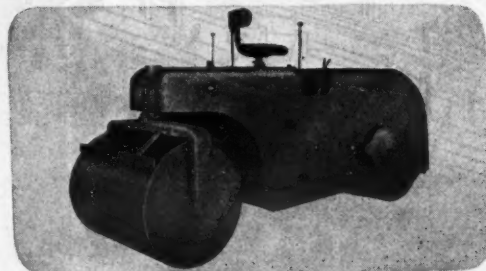
**HUBER MAINTAINER**

A versatile machine that also serves as a bulldozer, lift-loader, patch roller, snowplow, or rotary broom.



**HUBER 3-WHEEL ROLLERS**

Automotive type, built in sizes from 5 to 12 ton.



**HUBER TANDEM ROLLERS**

Variable weight, built in sizes from 3 to 12 ton.



**HUBER**

**ROAD MACHINERY**

*is on the job*

It is a lot of satisfaction in knowing that promises and budgets for road building and maintenance can be made with full confidence that the road machinery you own will back you to the limit. Huber 3-Wheel Rollers, Huber Tandem Rollers, and the versatile Huber Maintainer is just that type of equipment. Many, many years of experience in building road machinery, plus a working knowledge of your problems have gone into Hubers to provide the speed, power, and dependable performance you need to do your best work. Your Huber Distributor will be glad to discuss these points with you.

THE **HUBER** MFG. COMPANY • MARION, OHIO, U. S. A.

**HUBER**

3 Wheel • Tandem  
**ROAD ROLLERS  
and  
MAINTAINERS**



## New State Route Gets Gravel Base

Pit-Run Gravel Meets State's Specifications For a Selected Sub-Base; Paving and Sodding

♦ PIT-RUN gravel near the center of a 9.378-mile highway construction job on Arkansas State Route 25 very neatly solved the problem of placing a selected sub-base. The gravel was so perfectly graded in its natural formation that a power shovel loaded material steadily, with daily screen analyses meeting the specifications.

This use of native material is being made by D. F. Jones Construction Co. of Little Rock, Ark., on the new 9-mile stretch between Walnut Ridge and Paragould in northern Arkansas. The \$148,346 Arkansas State Highway Commission contract also calls for road-mixing a 22-foot 2-inch bituminous surface. Completion of the job about September 1 this year will make State Route 25 an all-paved highway between these two important communities.

Route 25 was last worked on in 1938, when a gravel base course was put down with some kind of paving planned. With the advent of World War II, construction plans had to be deferred for a time. The old alignment met all modern standards, however, so a great deal of the work in the Jones contract calls for a "reconstructed base" along this existing route.

Work consists, in general, of grading about 17,245 cubic yards to flatten the old slopes to a 6 to 1 ratio; rebuilding the road to a modern overall top width of 32 and 36 feet; placing 8 inches of compacted selected-gravel sub-base over the grade; and finally, road-mixing and placing the 22-foot paved riding surface.

### Grading Handled Easily

Grading involved yellowish hard-packed clay loam soil, not easy to dig when either wet or dry. An International TD-18 machine with a Bucyrus-Erie S-112 scraper was brought in, however, and this one machine performed all of the side dressing and grading. A Bucyrus-Erie cable-controlled Bullgrader mounted on an International TD-18 helped out as a pusher for a time, and heaping loads were turned out.

Most of the tractor work consisted of short hauls under 500 feet, digging off the humps and filling in the low spots along the highway embankment slopes.

Considerable yardage was involved in cutting down the top of a hill, when it became necessary to add to a fill west of that point in low land. A Northwest ¾-cubic-yard power shovel was used on that hill, both on the first contract cut and the extra cut called for a little later. Five dump trucks, all company-owned, consisting of four Fords and one Chevrolet, hauled excavated material from the shovel. This excavation was all alluvial gravel with some cementation present. But the deposit ran too high in 2-inch retained pieces for the loads to be used for anything but sub-grade.

### Selected Pit-Run Sub-Base

While the state highway specifications are extremely clear and rigid regarding selected sub-base material, the northern part of Arkansas abounds in native gravel deposits which are the envy of many a highway engineer traveling through that country. As a matter of fact, state specifications are slanted towards the screen gradation of this available native material. But this practice meets current AASHTO standards



C. & E. M. Photo

Backsloping on the Walnut-Ridge-Paragould highway in Arkansas is done by "hanging" this Bucyrus-Erie S-112 scraper on the slope.

agreeably enough to qualify the job as a Federal-Aid project.

Such a deposit was located about halfway through the Walnut-Ridge-Paragould highway. It fell rather close to the east end of the Jones contract.

A Lorain ¾-yard power shovel was used in this pit to bail truckfuls of fine gravel out to the new road. When the trucks were hauling the full 9-mile one-way trip, nearly 35 GMC and Ford dump trucks were rented for use. As

the haul decreased, the number of trucks was reduced. When the Western Editor of CONTRACTOR AND ENGINEERS MONTHLY visited this project, the haul had been reduced to 3½ miles and 10 trucks were keeping the shovel quite busy.

A State Highway Commission inspector stationed at this pit made daily checks on the pit-run material, taking samples out of the pit and also out of the loaded trucks. The rock was heated until it was dry, then run through a set of field testing screens and checked. In order to pass, the material met these requirements:

Size Screen	Per Cent Retained	Per Cent Passing
2-inch	0-5	....
1½-inch	0-15	....
¾-inch	15-50	....
No. 4	40-70	....
No. 10	55-80	....
No. 40	....	10-35
No. 200	....	5-15

The loads were hauled out to the newly widened subgrade, dumped 55 cubic yards per station to make a 5-

(Continued on next page)



1 JAW CRUSHER  
1 **TWINDUAL** ROLL CRUSHER  
3 STAGES OF REDUCTION

## THE AMAZING NEW UNIVERSAL **TWINDUAL**\* MASTER

Here's the first really new and advanced post-war gravel plant. Size for size and weight for weight the **TWINDUAL**\* MASTER has no equal for production. Under identical pit conditions it has out-produced larger, conventional model plants by 50 to 100%. **TWINDUAL**\* Rolls give two stages of secondary reduction and provide amazing capacity with savings in weight and power. Permits 100% wider primary discharge opening, doubling jaw crusher capacity and reducing jaw wear. For the first time, 3 full stages of reduction in a complete single-unit gravel plant. First stage—JAW CRUSHER; second and third stages—**TWINDUAL**\* ROLLS. Universal "Stream-Flo" Engineering again sets the standard for profit-making production and ready portability. For TOP CAPACITY at lowest cost per yard investigate the new **TWINDUAL**\* MASTER.

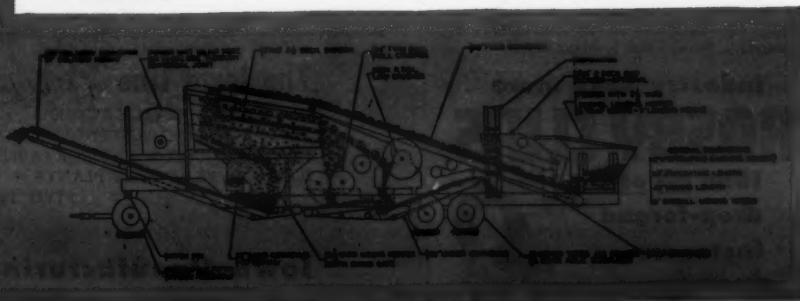
WRITE FOR BULLETIN No. 682

**UNIVERSAL ENGINEERING CORPORATION**

620 C Avenue N. W.

Cedar Rapids, Iowa

\*PATENTED







C. &amp; E. M. Photo

In a gravel pit at the east end of the Jones contract, this Lorain 3/4-yard power shovel loads a GMC dump truck with the fine native material.

## Gravel Base

(Continued from preceding page)

inch-thick uncompacted layer, and spread out smooth by a Caterpillar No. 12 motor grader. The second lift was added after the first had been opened to traffic for a few weeks. The action of pneumatic tires on passing automobiles will bind the new material together, make it dense, and provide a solid carrying surface under the new pavement, according to one of the state officials who is connected with the project.

### Road-Mixing

The road-mixing of special screened gravel and hot cut-back asphalt began shortly after June 1. Gravel for this operation was screened to meet even more precise specifications than those concerning the selected sub-base.

This gravel was hauled by dump truck from the screening plant to the job, and spread according to the calculated volumes per station. After it was spread out, a motor grader bladed it into a windrow and worked it for as long as a week until the rock contained less than 3 per cent of moisture.

Lion or Macmillan MC-1 asphalt was then shipped in to Paragould by rail, heated a few degrees above application temperature by a tank-car heater, and hauled out to the job. The gravel sub-base was tacked down with RC-1 before the road-mixing began.

A Barber-Greene road-mixing ma-

chine was used by the Jones Co., traveling through the job to blend the dried rock with asphalt. When it finished its part of the work, the Caterpillar motor grader laid out the road-mixed windrow slightly better than 2 inches thick, and an 8-ton steel 3-wheel roller compacted it.

### Solid Sodding on Job

The new job will be protected from side-slope erosion by nearly 60,000 square yards of solid Bermuda grass sod, being placed under a subcontract by J. B. Williams of Memphis, Tenn. This work is proceeding rapidly. It has made the project look dressed and finished even before the paving was completed.

The sod is cut off the top of a field near Paragould, about 9 miles from the job, by a tractor-mounted front-end grading knife fashioned on the order of a front-end loader. It is hauled out to the roadway by a Chevrolet or Dodge truck, and dumped near the placing location by the power hoists which



C. &amp; E. M. Photo

Workers place sod on an embankment backslope of Arkansas State Route No. 25. J. B. Williams of Memphis, Tenn., holds the subcontract for this work.

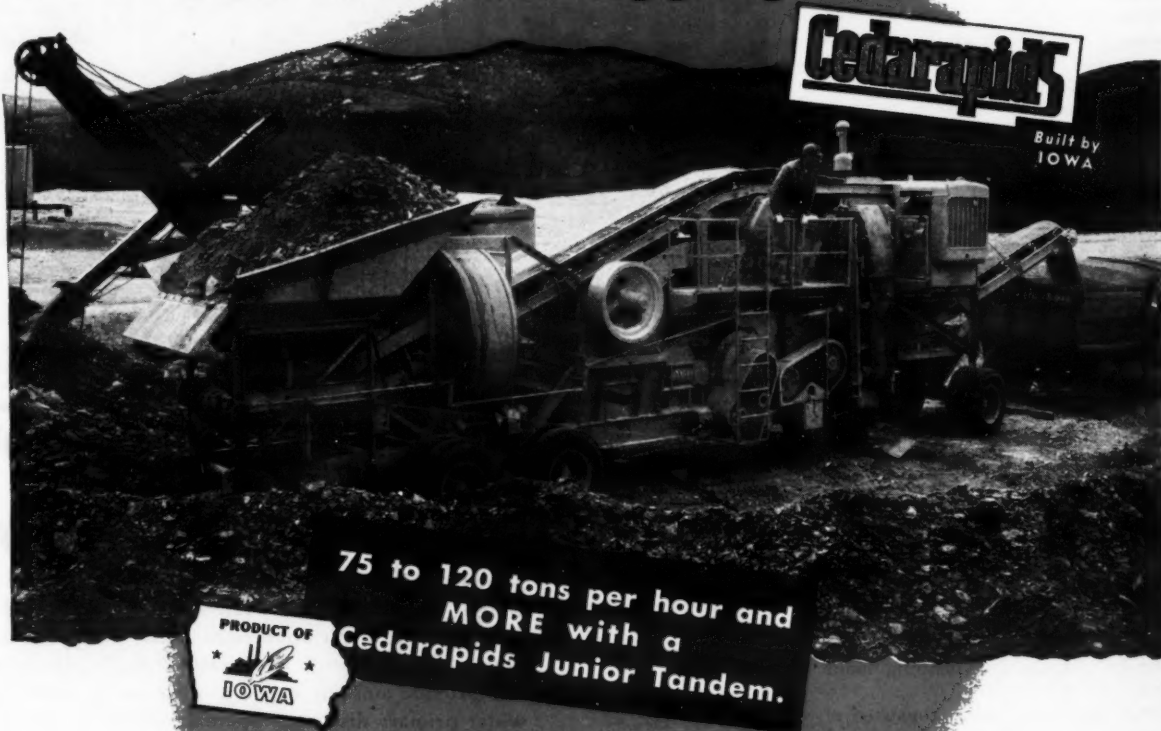
were mounted on the trucks.

A three-man crew with a foreman in charge has placed from 700 to 1,000 square yards of sod per 10-hour day ever since it began working. The sub-

contractor is doing one of those rare things which is always a delight to see: he is actually exceeding specification requirements in order to make sure his

(Concluded on next page)

## Cut construction costs ... with low-cost aggregates



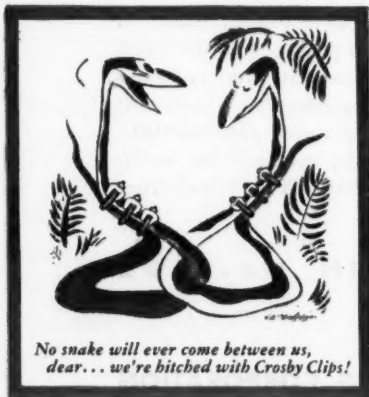
● In times like these, everything possible must be done to cut the high costs that are retarding construction work of all kinds. Modern crushing and screening plants with low operating and maintenance costs and high capacities will lower the cost of producing one of the basic raw materials. Cedarapids offers the Junior Tandem for that job.

It's a complete gravel crushing and screening plant that can be quickly converted to a crushed stone plant simply by adding a Cedarapids portable primary. The addition of a washing plant converts the Junior Tandem

to a multi-sized washed gravel and stone plant. Here's flexibility, portability and economy that mean low-cost aggregates for every construction job.

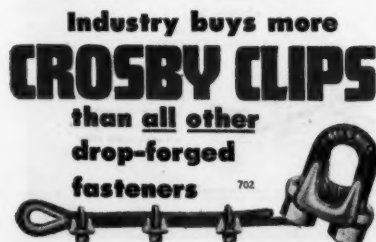
You can feed a Junior Tandem with a shovel, dragline or with any of the other standard, feeding units, move it wherever necessary, set it up for operation with the minimum of time and expense and crush and screen whatever is available close to the job.

When you buy a crushing plant—buy the best—buy Cedarapids. Better get the facts from your nearest Cedarapids dealer today.



No snake will ever come between us, dear... we're hitched with Crosby Clips!

To make wire rope hitches that no shock or strain will ever "put asunder"... use CROSBY CLIPS. They hold tight because of vise-tight design. Safe, simple, speedy. Drop forged, not cast. Hot dip galvanized. Sold by distributors everywhere; made exclusively by American Hoist and Derrick Company, Saint Paul 1, Minnesota.



### The Iowa Line of Material Handling Equipment Includes

ROCK AND GRAVEL CRUSHERS • BELT CONVEYORS • STEEL BINS • BUCKET ELEVATORS • VIBRATOR AND REVOLVING SCREENS • STRAIGHT LINE ROCK AND GRAVEL PLANTS • FEEDERS • TRAPS • PORTABLE POWER CONVEYORS • PORTABLE STONE PLANTS • PORTABLE GRAVEL PLANTS • REDUCTION CRUSHERS • BATCH TYPE ASPHALT PLANTS • DRAG SCRAPER TANKS • WASHING PLANTS • TRACTOR-CRUSHER PLANTS • STEEL TRUCKS AND TRAILERS • KUBIT IMPACT BREAKERS

Iowa Manufacturing Company, Cedar Rapids, Iowa, U. S. A.



## Gravel Base

(Continued from preceding page)

sod grows on the yellow clay soil. Specifications call for 2 inches of black topsoil with the sod, but the big chunks are being dug out with much more nearly 4 inches of good soil matted around the grass roots.

This will insure that the new-placed sod gets off to a good start. After it is placed on the slopes, a small 800-pound mule-drawn smooth roller is used to give it an even surface. It seems strange indeed to see such advanced well conceived roadside development work in a corner of Arkansas considered "out in the sticks" from the capital center of the state.

### Personnel

J. B. Williams is administering his own subcontract on sodding, which was bid in by the prime contractor at a price of 40 cents per square yard. The D. F. Jones Construction Co. has been represented by Superintendent P. M. Deal, and John F. Price has been the Resident Engineer for the Arkansas State Highway Commission.

J. C. Baker is the Director of Highways for the Arkansas Highway Commission, W. W. Zass is Chief Engineer, with E. E. Mashburn as Principal Engineer of Construction and in general charge of this job.

### Air Cleaner Is Described

A catalog on the features of its Aridifier, which removes water, dirt, oil, and scale from compressed-air lines, is available from the Logan Engineering Co., 4901 Lawrence Ave., Chicago, Ill. Drawings and photographs show how the four counter-rotating rotors whirl air clean and dry without the use of mazes, baffles, or filters, and without setting up any back pressure, according to the manufacturer.

Bulletin No. 147 contains four pages of tables, charts, and drawings which show how to select and install the proper Aridifier to meet job requirements.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 89.

### Portable Steel Buildings

Portable and sectional steel buildings for field offices, construction camps, field laboratories, and other uses are described in a catalog issued by the Inter-

national Derrick & Equipment Co., 875 Michigan Ave., Columbus 8, Ohio.

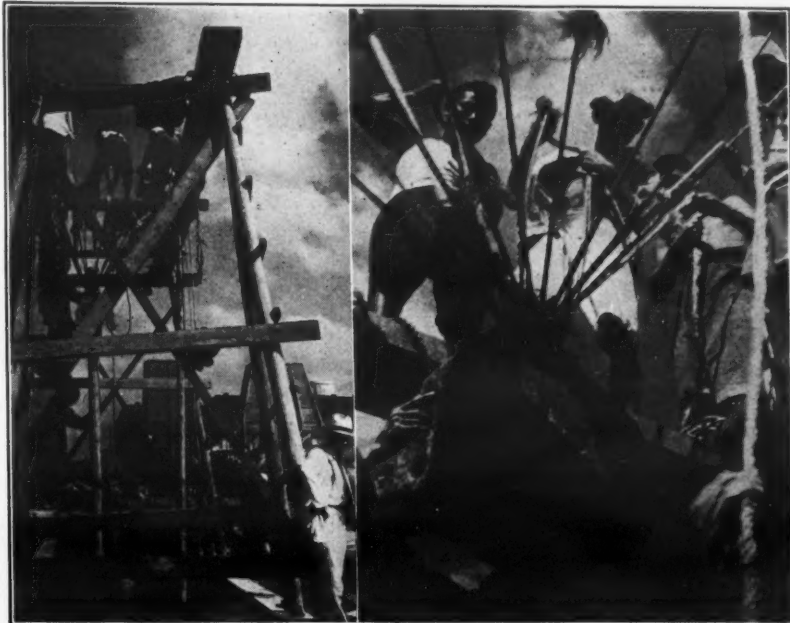
Bulletin BPO-46 lists details of the Ideco portable buildings, features of the Ideco sectional buildings, and six suggested plans for the erection and use of either type as headquarters, camp quarters, washrooms, toilets, kitchens, etc.

These buildings are specially designed for warm-climate use, and the majority have been going into the export market for use in tropical countries. However, the company has designs under way for a building for colder climates, and expects to offer it to the market soon.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 82.

Photos by Harrison Forman

"Rice power" runs the unusual pile-driving rig in China shown at the right. Ropes are attached to a heavy stone to serve as the hammer. Then the workers, chanting all the while, pull in unison on the ropes and drop the stone on the pile at a signal from the foreman. The foundations of Shanghai's modern skyscrapers were built with coolie-powered pile drivers such as this.



## The Hydraulic Torque-Converter Tractor ... Takes Work Away From Operator YET GETS MORE WORK DONE!

### PRODUCES MORE

The hydraulic torque converter tractor gets more done because it works at higher average speeds—achieved in numerous ways. Torque converter automatically and constantly keeps tractor at a travel speed which utilizes full engine horsepower, regardless of load . . . also provides fast acceleration—peak hauling speed reached quickly. Keeps tractor moving by eliminating most of the gear-shifting. Increases operator efficiency because there's less effort required to operate tractor.

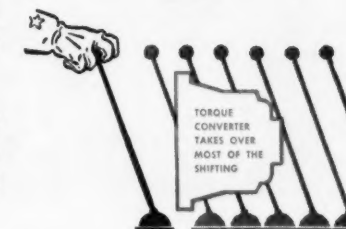
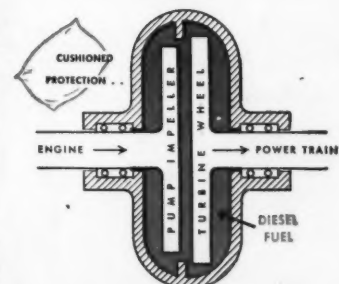
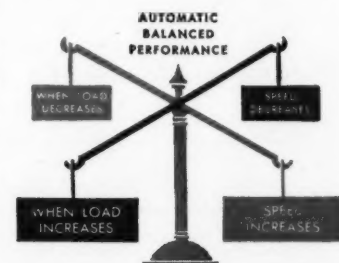
### CUTS UPKEEP COST

Longer life, less breakage and wear are assured for tractor and auxiliary equipment because operation is continuously smooth. There is no shock from master clutch engagement, because in the torque converter tractor it engages under no load. The diesel fuel, which operates the converter, acts as a cushion between engine and tractor train—no sudden twists or jerks can be transferred between driving and driven parts.

### MAKES IT EASIER FOR OPERATOR

No restarting—engine can't be stalled. No constant shifting—torque converter automatically selects the maximum speed in each of the wide speed ranges at which load can be moved. No jolts and shock to tire operator—power flow is smooth and even.

To approach the accomplishment of a torque converter . . . a fluid coupling would be required; plus a transmission with an unlimited number of gear ratios, and an operator with the impossible task of continuously shifting into the right gear at just the right moment—instantaneously.

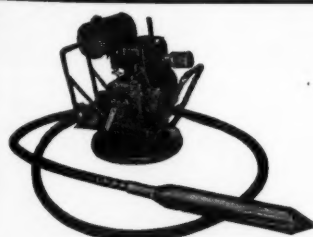


### WHAT THE TORQUE CONVERTER IS

The Twin Disc torque converter in Allis-Chalmers tractors is a remarkably simple mechanism. It consists of only two wheels—impeller and turbine—rotating independently of each other in an oil-filled housing. The impeller is directly connected to the engine, and the turbine to the power train.

**ALLIS-CHALMERS**  
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

★ Originator of the  
Torque-Converter Tractor



### Concrete VIBRATORS

Gasoline Engine or  
Electric Motor Driven  
**CONCRETE GRINDERS**

OTHER PRODUCTS  
**FRONT END SHOVELS**  
for Industrial Tractors

**HEATING KETTLES**  
for Asphalt and Tar

**AGGREGATE DRYERS**  
for Stone and Sand

**ASPHALT PLANTS**  
Portable—Stationary

Write for Circulars

**White Mfg. Co.**

ELKHART

INDIANA



**CEMENT.** With dirt moved and drainage installed on the Los Angeles Municipal Airport job, Morrison-Knudsen Co., Inc., begins base processing. Tankers built by Gardner Road Mixers, Inc., haul in bulk portland cement. A Gardner cement meter introduces 61,640 pounds into each 1,340-foot-long earth windrow.



**WINDROWS.** As a Euclid hooks on to give the cement tanker a boost, Project Engineer William Thompson and Superintendent Martin Green study earth windrows. These have been carefully checked for a volume of 5 cubic feet per lineal foot, and will have a cement content of 12 per cent by dry weight.

# Soil-Cement Base for Runway

Stabilized Base 9 Inches Thick, Resting on a 6-Inch Subbase  
Is Part of 40-Day Contract to Lengthen and Pave Main Runway

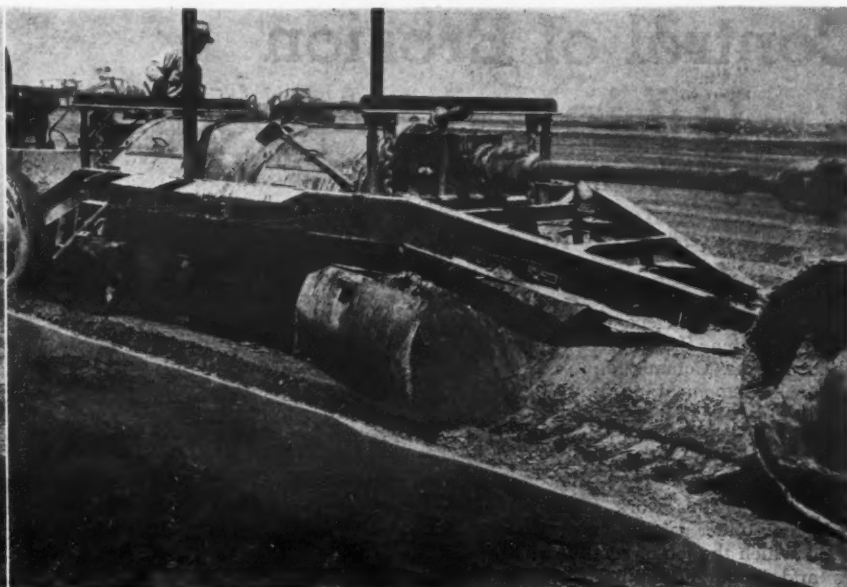
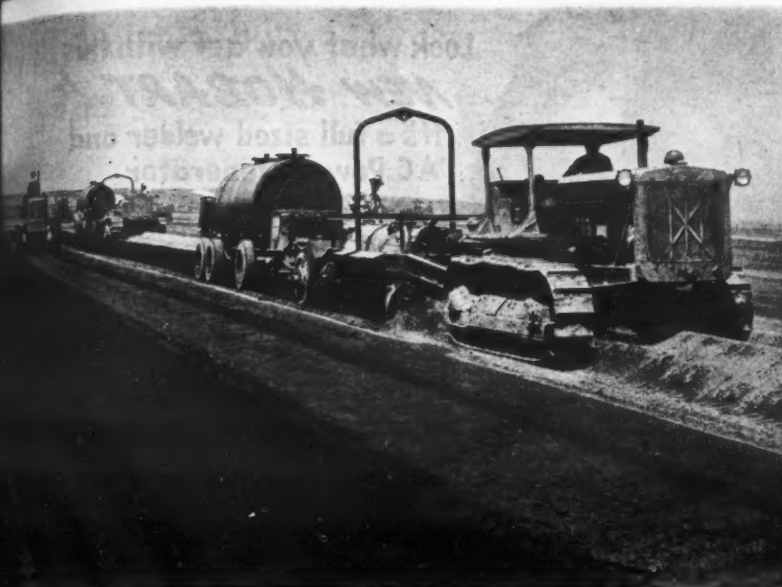
(See article on page 6)



**LAY-DOWN.** Caterpillar and Adams motor graders then make the first pass to lay the mixed soil-cement in place. Their blades put the uncompacted material down as rapidly as possible in two lifts. In the picture shown above, field engineers check windrow volume. Below, it is midday and other work goes on alongside the graders.







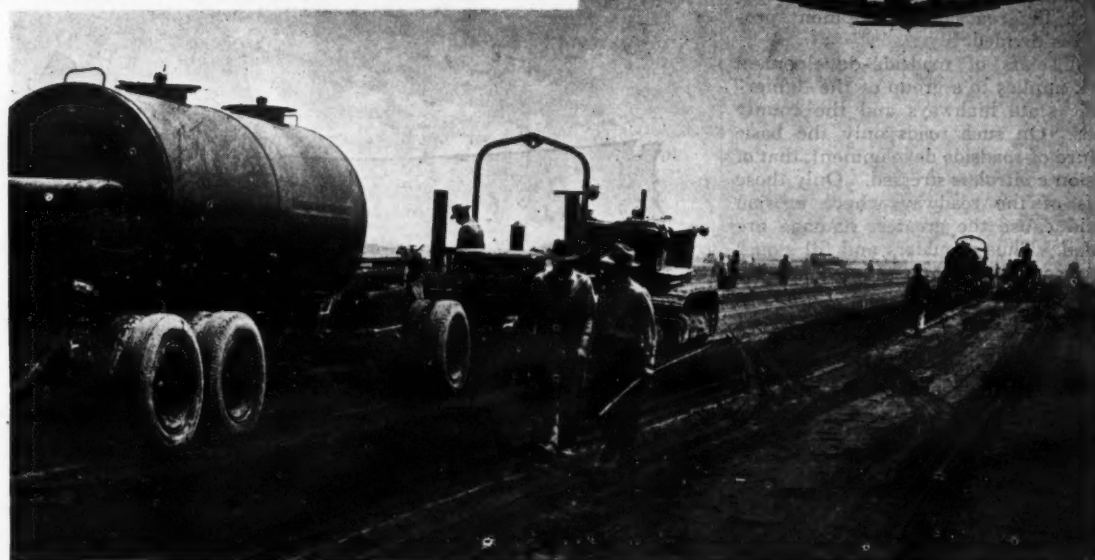
**MIXING.** Next, a Wood Roadmixer makes one pass through a windrow, while its companion on the job works an adjoining windrow laid 7 feet away. The Roadmixers travel about 18 feet a minute, driven by Caterpillar D8's through a rear drive. Hooked to each by hose is a water tank to furnish the mixing water.

**MOISTURE.** The Roadmixer adds enough water to bring the moisture content up to 10 per cent. And in one pass it blends the earth and cement in the heavy windrow to a uniform consistency. Meanwhile giant planes roar skyward only 100 feet or so overhead.

# Extension

h Subse,  
in Rway

(C. & E. M. Photos)



**COMPACTION.** A tandem set of Southwest sheepsfoot rollers behind a Caterpillar D8 rolls the lift to its initial compaction; a small tank sprinkler truck adds water. Then a Bros Wobble Wheel roller rolls the lift to final compaction—95 per cent Proctor density.



**BLUE-TOPS.** Workmen set blue-tops as a guide in blading the soil-cement to grade; only curing, sealing, and final paving remain to be done.

**PERSONNEL.** Grinning approval of the \$213,346 job, which was finished within a 40-calendar-day limit, are: John McNerney (left), Field Engineer of the Portland Cement Association; Col. C. L. Bell, Deputy City Engineer of Los Angeles, and Martin Green, Superintendent for the contractor.

# Control of Erosion Is Linked to Seeding

## Roadside Development in North Carolina Follows Highway Building; Work Done by Force Account

THE Landscape Department of the North Carolina State Highway and Public Works Commission plans its roadside-development program to follow closely behind highway construction or reconstruction. This contributes to the safety, utility, and better appearance of the roadway.

The bulk of this work is done by hired labor under a force-account system, in which the job of seeding shoulders and slopes and other roadside-development features begins at the completion of the construction contract. Erosion control, which is brought about largely by careful and thorough seeding, is stressed in all three classes into which the roadside-development program is divided.

One class of roadside-development work applies to a group of the lighter-traffic state highways and the county roads. On such roads only the basic feature of roadside development, that of erosion control, is stressed. Only those parts of the roadway where erosion would cause the greatest damage are seeded. Thus shoulders and fill slopes are seeded but not necessarily all the cut slopes. For on this type of road the ground areas disturbed by construction are not generally extensive, and are more susceptible to self-healing by volunteer vegetation. Therefore complete erosion-control treatment is not called for from an economic standpoint or justified on the basis of appearance alone.

On the next-higher type of road—higher in importance because of the amount and kind of traffic—a more complete erosion-control program is worked out. It includes the cut as well as the fill slopes and shoulder seeding. In addition, the roadside is carefully cleaned up; scars of construction are removed, or hidden sharp transitions between cuts and fills are smoothed over to render a more pleasing appearance; selective cutting and trimming of trees and shrubs is undertaken; vistas are opened up in behalf of eye appeal; more attention is given to tree protection; and scenic turnouts are constructed.

Considered the highest type of road in the state is the through highway. On this artery the highest class of roadside development is incorporated. This is an accumulative proposition; for besides all the features of the first two groups, the program for this type of road includes picnic-table areas, roadside parks, and limited planting for landscape effect alone. Naturally, these added features are scheduled only when the traffic, location, desirability, and other factors are carefully considered.

### Break With the Past

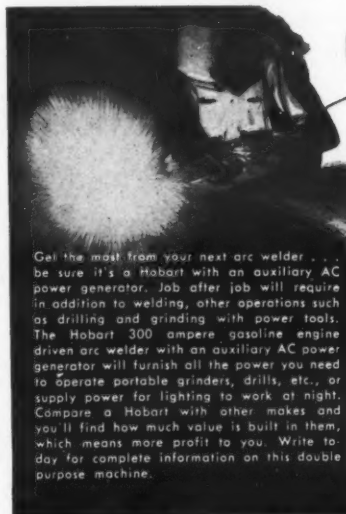
Coincident with roadside development there have been some startling changes in methods of construction over a few years' time. Not so long ago, after a road was staked out for construction, the contractor was accustomed to clear everything standing between the right-of-way lines. Then he would begin grading operations, during which all the valuable topsoil usually found its way to the bottom of the fills.

Now clearing is restricted to a 10-foot strip extending beyond the construction lines, and not reaching all the way to right-of-way lines. Even within this 10-foot belt certain trees may now be marked for preservation as long as they do not constitute a hazard to the safety

of the highway user. The trees to be spared are circled with a white cloth before clearing and grubbing get under way.

Former roadside-development work included a lot of earth-moving and surprisingly heavy grading, even after a contract had just been completed. This was attributable to the desire for flatter slopes than the contract stipulated, in order to facilitate seed planting. For economic reasons the heaviest cuts are still constructed on a 1 to 1 ratio, but there has been a decided trend towards greater use of 1½ to 1 and 2 to 1 slope ratios.

Then too, seeding and mulching have better results now because of a constantly increasing knowledge of the (Continued on next page)



Look what you get with this  
**NEW HOBART!**  
It's a full sized welder and  
AC Power Generator

HOBART BROTHERS COMPANY  
Box CE-87, Troy, Ohio

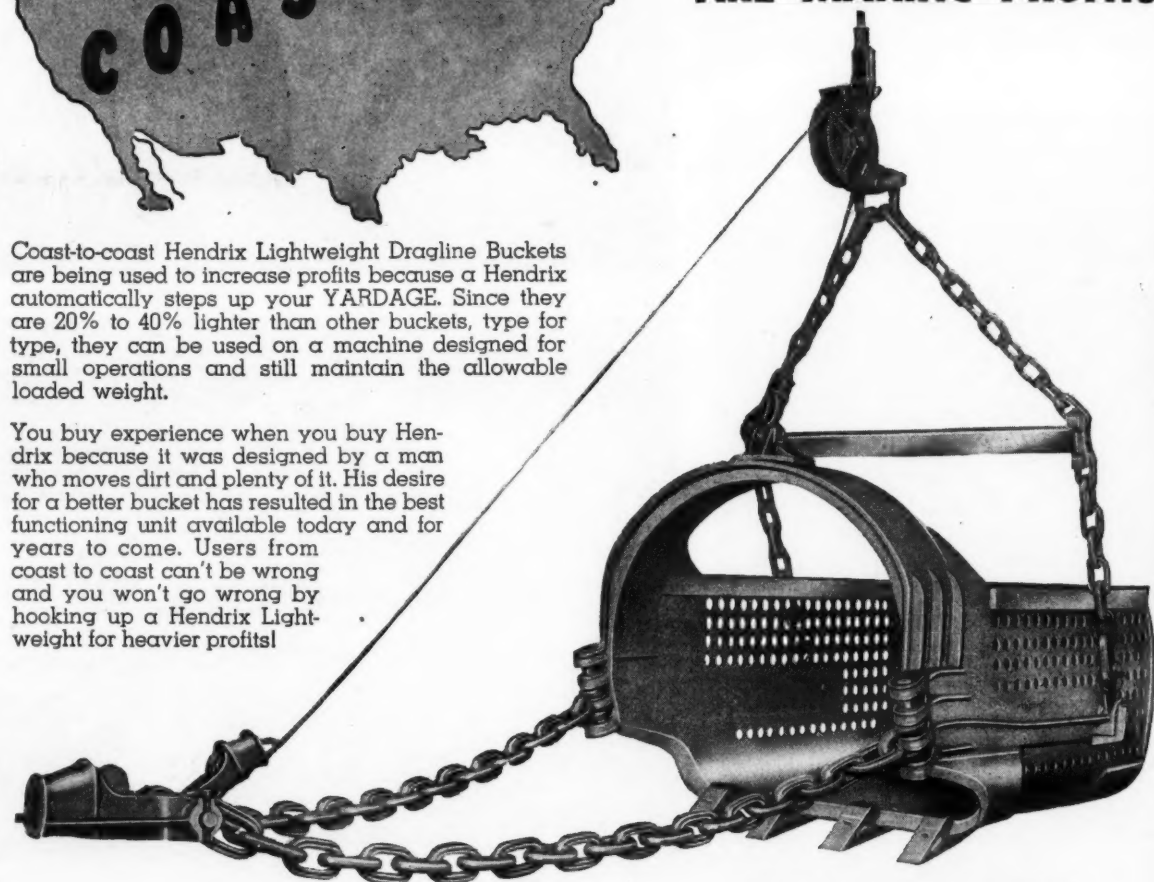
Encircled above is control and outlet panel of 6 K.W. A. C. Power Generator available on Model GR-3006-S welder. Model GR-3012-S embodies same 300 Amp. Welding Generator, but has a 12 K.W. AC Generator.

"One of the World's Largest Builders of Arc Welders."



Coast-to-coast Hendrix Lightweight Dragline Buckets are being used to increase profits because a Hendrix automatically steps up your YARDAGE. Since they are 20% to 40% lighter than other buckets, type for type, they can be used on a machine designed for small operations and still maintain the allowable loaded weight.

You buy experience when you buy Hendrix because it was designed by a man who moves dirt and plenty of it. His desire for a better bucket has resulted in the best functioning unit available today and for years to come. Users from coast to coast can't be wrong and you won't go wrong by hooking up a Hendrix Lightweight for heavier profits!



3/8 TO 40 CUBIC YARDS

- ★ 20% to 40% lighter than other buckets, type for type.
- ★ All welded construction for greater strength and durability.
- ★ Manganese Steel Chains fittings and reversible tooth points.
- ★ Full Pay load every trip, even in wet digging.
- ★ Perfect Balance; handles easier, fills faster, dumps cleaner.
- ★ Three types: light, medium, and heavy duty. With or without perforations.

**HENDRIX**  
*Lightweight* DRAGLINE  
BUCKETS

Write for descriptive literature  
or ask your dealer

**HENDRIX MANUFACTURING COMPANY**  
MANSFIELD INCORPORATED LOUISIANA



## Control of Erosion Is Linked to Seeding

(Continued from preceding page)

processes. And a good cover of vegetation has been grown often enough on steeper slopes to dispense with the slow and costly process of laying back slopes which may just have been established.

Today topsoil is often salvaged and stockpiled before heavy grading begins, according to the terms of many contracts. Trees, marked for preservation, may also be noted in special clauses. Thus the work of the roadside-development crews can be concentrated on their own type of activity. Emphasis can be laid on erosion control rather than on grading, for instance, which is now left solely to the contractor. Little bumps or ridges remaining after the job is finished are removed by the force-account men. But this is light work and easily handled by means of a motor grader or other light equipment.

### Department Organization

Roadside-development operations are handled by the Landscape Department which is headed by a Landscape Engineer with headquarters at Raleigh. In charge of the work throughout the state are seven Landscape Supervisors. They report to the Landscape Engineer, yet work directly with the various Division Engineers. These Supervisors are responsible for the successful completion of their projects, and decide themselves many of the details of when and how they will carry out their assignments.

Eventually the Department hopes to have a Supervisor for each of the ten divisions in the state. But at present three of the Supervisors must cover two divisions. Their work may cover the incorporation of roadside-development features into contracts only just completed, or into existing roads; the latter are being tied in with regular maintenance operations.

The Landscape Supervisors recruit a crew of force-account workers. Some, perhaps, are taken from the permanent roster of maintenance personnel in the Division. Others are new and temporary employees hired for a particular job. It has been the experience of the Department that well trained and experienced workers in this field are very hard to obtain.

In the meantime the planning of future roadside development is taking shape. Directly after the alignment of a highway has been decided upon, but before details of plans have been completed, the Landscape Department makes a field inspection of the location. Soils are investigated and decisions made as to the amount and type of roadside development that will be done.

It is true that erosion control may be considered the most important single phase of the program, since it definitely contributes to safety, economy of highway maintenance, and improved appearance. However, other aspects of driver services which were mentioned in the third group of highways are given full consideration. Very little ornamental planting is done, though, as beautification of the highway by itself

is not stressed. Such planting is done only as it works in with the more important aspect of erosion control.

### Seeding Vs. Erosion

As soon as a contractor finishes building a highway and it has been accepted by the Commission, the plans that have been projected for roadside development are put into effect. Seeding the slopes as quickly as possible means that the new roadway is held together and erosion does not get a chance to start its destruction. The Landscape Supervisors have been observing the construction and know just where the areas are located that need seeding the most.

Spring and autumn are the best times of year for seeding, but great latitude is enjoyed because of the varying climate in different sections of the state. In the southeastern section along the coast, for instance, seeding may begin as early as February. In the mountainous area in the west the ground may not be ready until April. The middle of November

(Concluded on next page)



A reminder to "be prepared"—this bulldozer-equipped Caterpillar D8 tractor worked 24 hours a day to reach a snowbound town in Washington after snow slides had blocked it from the rest of the world. The State Department of Highways borrowed the modern Saint Bernard from owners Goetz and Brennan of Seattle.

There's  
**AN INGRAM**  
FOR EVERY JOB!

5 Sizes....

4 to 12 Tons



### See Your Distributor —

ALABAMA—Birmingham  
Equipment Service Company  
ARIZONA—Phoenix  
Mitchell-Kennedy Equipment Co.  
ARKANSAS—Little Rock  
Kern-Limerick, Inc.  
CALIFORNIA—Los Angeles  
Shaw Sales & Service Co.  
COLORADO—Denver  
Constructors Equipment Co.  
CONNECTICUT—Bridgeport  
The Arnold Company  
DISTRICT OF COLUMBIA—Washington  
John L. Steward Co.  
FLORIDA—Jackson and Miami  
Florida-Georgia Tractor Co.  
FLORIDA—St. Petersburg  
C. G. Hewitt Machinery  
GEORGIA—Atlanta  
Statham Mach. & Equipment Co.  
GEORGIA—Waycross  
Florida-Georgia Tractor Co.  
IDAHO—Boise  
The Sawtooth Co.  
ILLINOIS—Chicago  
L. Z. Howell Co.  
INDIANA—Indianapolis  
Flesch-Miller Tractor Co.  
KANSAS—Wichita  
Phillips & Easton Supply Co.  
KENTUCKY—Lexington  
Sheppard & Bogie Equipment Co.  
LOUISIANA—Baton Rouge  
Dunham-Pugh Co., Inc.  
MARYLAND—Silver Spring  
R. S. McCeney  
MINNESOTA—St. Paul  
Construction Equipment Sales, Inc.  
MISSISSIPPI—Amory  
Dalrymple Equipment Co.  
NEW JERSEY—Newark  
North Jersey Equipment Co.  
NEW MEXICO—Albuquerque  
Harry Cornelius Co.  
NORTH CAROLINA—Raleigh  
North Carolina Equip. Co.  
OHIO—Cleveland  
George P. Williams Co.  
OKLAHOMA—Oklahoma City  
R. C. Hardcastle Co.  
OREGON—Portland  
Contractors Equipment Corp.  
PENNSYLVANIA—Pittsburgh  
Conto Equipment Corp.  
TENNESSEE—Knoxville  
Power Equipment Co.  
TENNESSEE—Memphis  
Road Builders Equip. Co.  
TENNESSEE—Nashville  
Buchanan & Rooney Equip. Co.  
TEXAS—El Paso  
Equipment Supply Company  
TEXAS—San Antonio  
Acme Wire & Iron Works  
UTAH—Salt Lake City  
Rasmussen Equip. & Supply Co.  
VIRGINIA—Richmond  
Bemis Equipment Corp.  
WASHINGTON—Seattle  
Service Equipment Co.  
WASHINGTON—Spokane  
Inland Tractor & Diesel Co.  
WISCONSIN—Milwaukee  
Diamond-Colleton Equip. Co.  
WYOMING—Cheyenne  
Wilson Equip. & Supply Co.

YOUR rolling job—large or small—can be done better and more profitably with an Ingram.

That's because each Ingram is built to exacting requirements in every model. Every Ingram Roller has the right engine unit for ample, yet economical power. And no feature has been overlooked to make the Ingram easy on your operator.

That means more and better rolling for YOU!

Ask your Ingram distributor to show you the roller that fits your needs. Let him show you how the shorter wheelbase increases maneuverability—the positive control steering eliminates "jiggling"—how the fully enclosed mechanism reduces breakdowns. It all adds up to increased rolling profits—so see your distributor now!

**INGRAM  
ROLLERS**

ACME WIRE & IRON WORKS SAN ANTONIO, TEXAS



**SAVE LABOR  
SAVE LUMBER**

Make Board Pulling Fast & Easy

This wrecking tool tears up all frame construction faster without splitting boards. Simply, sturdy. Pays for itself in a few hours. **\$17.50**

Write for circular and special contractors discount  
**G. P. GRIEVE CO.** 428 Stinson Blvd.  
Minneapolis 13, Minn.



## Control of Erosion Is Linked to Seeding

(Continued from preceding page)

generally sees the end of seeding operations, although in some years all-winter seeding is possible in the southeastern section.

With the increased knowledge of seeding made available within the past ten years, particularly in the use of mulches, seed can now be placed in the ground almost throughout the entire year, even in mid-winter or mid-summer. This out-of-season seeding is not necessarily of a permanent nature, nor is it meant to be so. The important thing is to get a cover crop growing and develop a root system that will hold the ground together on the freshly made slopes and shoulders. It is more economical in the long run to seed twice rather than to leave the ground bare and have the exposed soil wash away. Cover crops of oats, rye, and Sudan grass, that have one growing season but do not come back again, are used with good results in temporary seeding.

In the normal seeding operations, the soil tests of each individual project are carefully studied, along with the locality, before a choice of fertilizer and seed is made. With the present scarcity of such supplies (particularly fertilizer) the availability of material also is a big factor in determining what to use. Lime is first spread over the ground by a lime spreader in amounts varying according to the condition of the soil. Harrows work the lime into the earth. Then the seed and fertilizer are applied.

On flat areas and on slopes up to 3 to 1, seeding is generally done with a combination seed and fertilizer drill. These regular farm-type drills are of variable size, usually 5 or 6 feet wide with the planting disks 6 to 8 inches apart. They are pulled by either a truck or light tractor. On steeper slopes a rubber-tired or a light crawler tractor works along on top, pulling a drag harrow across the slopes to loosen soil and cover seed and fertilizer. Seeding on steep slopes is done either by hand or with a whirlwind-type seeder.

The basic seed used is Lespedeza, both the annual Kobe and Korean varieties, and the perennial Lespedeza sericea. This produces good results even in the Piedmont belt, where it is much harder to grow grass than on the coastal plain to the east, or in the mountainous areas to the west. Other grasses and legumes are used according to local conditions and in various proportions. Some of these are redbud, white Dutch clover, and orchard grass.

### Mulching

After seeding, the usual practice is to mulch the slopes. Because of the fire hazard caused by motorists carelessly flicking away a cigarette, this is dispensed with on the shoulders. Very little straw or hay obtained from commercial sources is used in the program because of the scarcity of such materials and the consequent high cost. Roadside trimmings gathered in with hay rakes and transported on trucks serve the purpose very well.

On one occasion the Department hired a farmer to cut over an airfield after arrangements were made with the owners for the use of the trimmings. Deals have also been made with farmers who want to put back into crop a particular field which has been overgrown with native weeds, broom sedge, or non-noxious weeds. To get the material the Department will mow the field and haul the cuttings away.

The mulch is cast over the ground with pitchforks and will stay without further attention on fairly flat slopes such as 2 or 3 to 1. On 1½ to 1 and steeper slopes the mulch must be

anchored in place. Various methods have been employed for this purpose. These include driving small wooden stakes at regular intervals and passing binder twine around their tops in a criss-cross pattern; putting heavier brush on top of the mulch; placing a layer of cornstalks over the slopes; and scattering some dirt on top. A crew of 6 to 8 men is usually sufficient for seeding operations with drilling equipment. A crew of double this size is used when considerable mulching is being done.

### Administrative

The selection of roads which will receive roadside-development treatment is pretty much determined by the record they have on erosion. Roads with a bad record naturally get treated first. When a road is reconstructed, the new slopes with the exposed raw ground are on the list for attention.

Widening a 13-mile stretch of concrete pavement last year, on U. S. 17 south of New Bern in the eastern part of the state, was a typical instance. There roadside development was put to work (1) to prevent erosion of the newly formed slopes by seeding, and (2) to render a more pleasing appearance by selective cutting of trees and shrubs. Most of this job was finished last autumn, with the remainder to be done in early spring. While this highway falls into the most advanced classification, that of the through road, local conditions did not warrant more detailed treatment than seeding and thinning.

The cost of this work, while done by force account, was included as part of the construction costs of that road under the same project number as the contract work.

### Personnel

Frank H. Brant, Landscape Engineer, heads the Landscape Department of the North Carolina State Highway and Public Works Commission. A. H. Graham is Chairman of the Commission, and W. Vance Baise is State Highway Engineer.

### Tool-Firm Branch in N. C.

The establishment of a service branch in Charlotte, N. C., has been announced by The Black & Decker Mfg. Co. Located at 117 E. 9th St., it will offer factory service for Black & Decker and Van Dorn portable electric tools.

### Two-Wheeled Spreaders

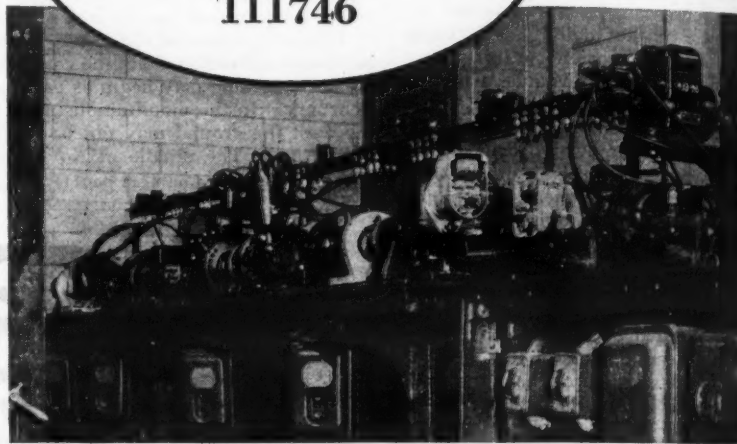
Spreaders for use in keeping roads safe and in shape are described in a bulletin of the Peoria Steel & Wire Co., Inc., Peoria, Ill. Listed are the Paramount wagon model, the truck model, and the special truck model equipped

with a telescopic hitch.

The folder describes six features claimed for its units by the manufacturer. It includes special equipment and price lists.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 74

## Biography of WICO magneto 111746



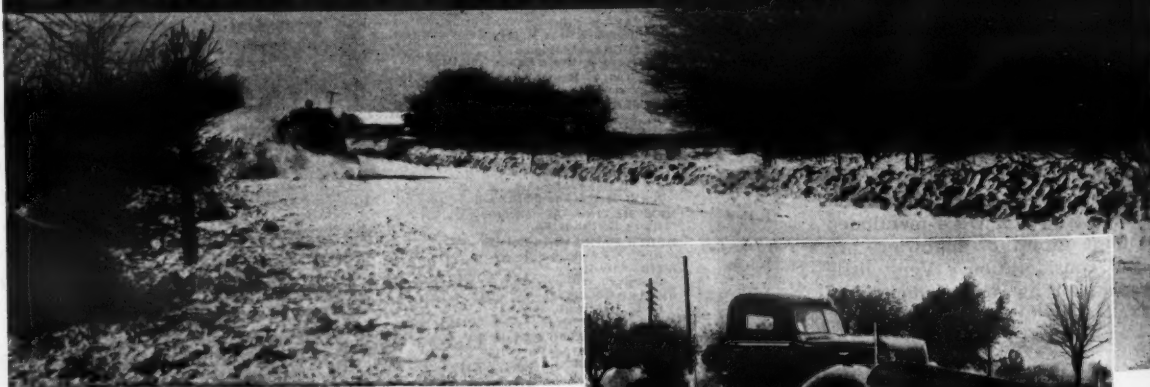
About sixty WICO magnetos a month are taken from the production line, put on a test bench and given an operating-life test. Here's an excerpt from the report of the Engineering Department on #111746 after nearly three months' testing, "Magneto was examined after 1936 hours. Bearings were tested and were within gauge tolerances. Other parts also O.K. The test was continued."

Such care in manufacture, such application of engineering skill

to production, are what make a WICO the best magneto buy. The postwar "X" models are the last word in magneto development, the result of 50 years of building fine ignition equipment. They're built to 1947 aircraft standards, and equip some of the finest spark-ignited engines in the world. More than a thousand authorized service stations and a specially trained corps of field engineers serve WICO buyers and users everywhere. Wico Electric Company, West Springfield, Massachusetts.



*Soon it will be like this—*



### GET READY WITH A GLEDHILL SNOW PLOW!

Insert shows standard plow with under-truck mounting. No holes to bore—hook bolts clamp over main truck frame. Crimped moldboard keeps snow light, aerated and fast flowing.

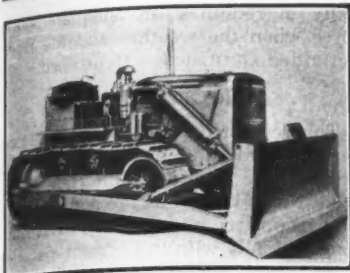
Send for detailed bulletin!



AVAILABLE THROUGH DISTRIBUTORS  
ACROSS THE NATION

**GLEDHILL ROAD MACHINERY CO., Galion, Ohio**





The Caterpillar No. 78 straight-type hydraulic-controlled bulldozer is shown here mounted on the new Caterpillar D7 track-type tractor. Hydraulically controlled bulldozers are now also available for the D8, D6, and D4 track-type tractors.

## Hydraulic Bulldozers Made in Four Sizes

Hydraulically controlled bulldozers have been added to the line of earth-moving equipment made by the Caterpillar Tractor Co., Peoria 8, Ill. They are available for the D8, D7, D6, and D4 track-type tractors. They are offered in addition to the cable-controlled models for D8, D7, and D6 tractors.

Features claimed for the Caterpillar hydraulic system include: front-mount, positive action, balanced vane pump, integral with tank and operating valves; manually operated three-position valve, with raise, lower, and hold positions; and high-pressure hose, reinforced with two plies of steel wire, said to offer resistance to heat, oil, and the elements.

Both straight and angling-type blades are offered for all models except the D4, which is now available only in the straight type. The hydraulic cylinders of the units offered for use with the D6, D7, and D8 tractors are mounted over the push arm and are positioned alongside a specially constructed engine guard extending from the radiator guard in the front of the pump housing.

In the No. 4S, the hydraulic cylinders are mounted on box-section brackets located alongside the operator's seat; the power of the pistons is transmitted to the push arms through the action of connecting triangular cranks.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 10.

## Self-Sealing Features New-Style Couplings

A line of self-sealing couplings is manufactured by the Aeroquip Corp., 303 So. East Ave., Jackson, Mich. These couplings are designed to permit all types of fluid lines to be connected and disconnected without the loss of fluid or induction of air into the system.

They can be used with oil, fuel, water, or air at temperatures ranging from -40 to +250 degrees F. And they are available in sizes ranging from 1/8 to 1 1/2-inch pipe threads.

The Aeroquip Corp. also manufactures a complete line of industrial flexible hose lines, all of which are equipped with detachable and re-usable end fittings. The company provides complete engineering services for its customers.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 98.

## Goggles for Eye Safety

A complete line of all-plastic goggles for eye-protection is offered by Watchmoke Optical Co., Inc., Providence 3, R. I. Eye Savers, with shatter-proof Plexiglas lenses, are made in two styles: one with rectangular frame and two-piece replaceable lenses; one with face-fitting curved frame and one-piece replaceable lens. Both types fit over most styles of prescription glasses.

Leaflets are available showing the various models and describing the company's complete goggle line.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 93.

## Membrane Curing Compound

Folders on its membrane curing compounds are being distributed by Hunt Process Co., 7012 Stanford Ave., Los Angeles 1, Calif. These folders outline the necessities for and methods of curing concrete. They describe Hunt Process Clear, Hunt Process Black, Hunt Process White Pigmented, and Hunt Process Gray Pigmented, where they should be used, their advantages, methods of application and quantities required.

The folders give suggestions about hot and cold-weather curing and the means for determining the quality of a curing compound. Also shown is the equipment used for applying Hunt Process.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 53.

## A Roller For Every Job

Sturdy, heavy-duty rollers, engineered to stand up under the toughest conditions. Pierce-Bear Tandem Rollers are powered by economical Allis-Chalmers 4-cylinder industrial type gasoline engines. Variable weights, from 3 1/2 to 5 tons with built-in water tanks for ballast and wet rolling.



Pierce Baby Bear 2 1/2-3 tons



Pierce Medium Bear 3 1/2-5 tons

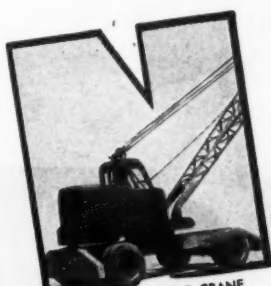
The new 2 1/2-3-ton Pierce Baby Bear is designed for close-in work and small area maintenance. It works against a curb up to 25 inches high and within 1 1/2 inches of a higher wall or building. Final drive is within the rear roll. Use Pierce-Bear Tandem Rollers for all-around performance. Write for folder.

## Pierce-Bear Rollers Lewis Manufacturing Company

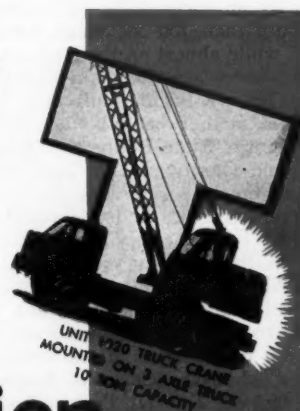
415 Hoefgen Avenue—San Antonio 6, Texas



UNIT 1020 MOBILE CRANE WITH 2 AXLE UNDERCARRIAGE 10 TON CAPACITY

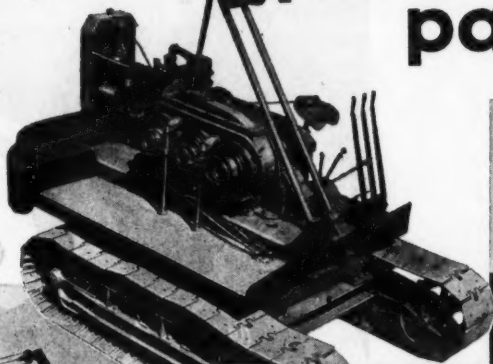


UNIT 357 MOBILE CRANE WITH 2 AXLE UNDERCARRIAGE 5 TON CAPACITY

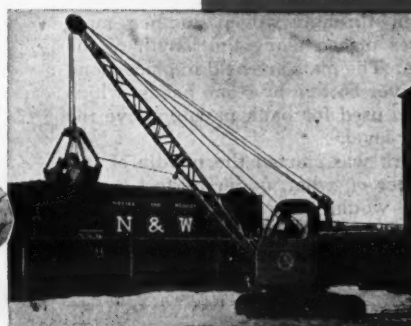


UNIT 1530 TRUCK CRANE MOUNTED ON 3 AXLE TRUCK 10 TON CAPACITY

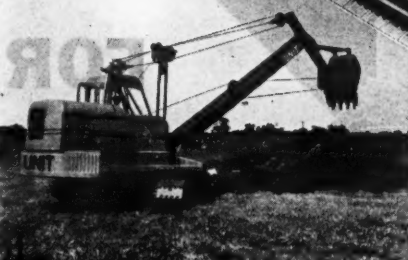
## production parade



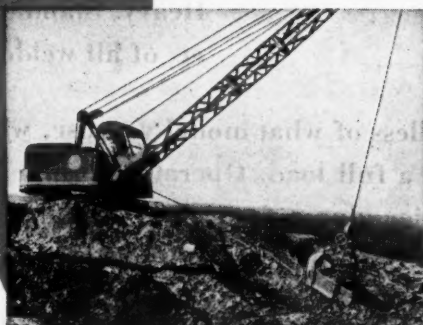
MAIN MACHINERY AUTOMATIC TRACTION BRAKES STRAIGHT LINE ENGINE MOUNTING ONE PIECE CAST GEAR CASE



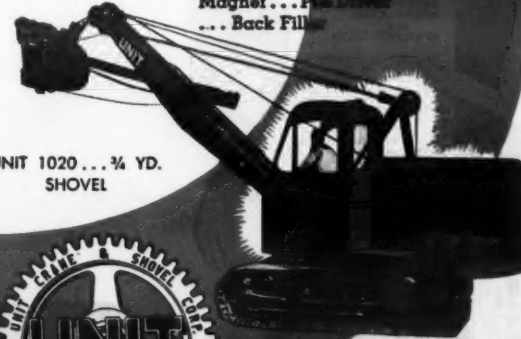
UNIT 514 1/2 YD. CLAMSHELL



UNIT 1020 1/4 YD. TRENCHER



UNIT 514 1/2 YD. DRAGLINE



UNIT 1020 1/4 YD. SHOVEL

CONTACT FACTORY DIRECT FOR PRICE AND DELIVERY

Full-Vision Cab... ENABLING OPERATOR TO SEE IN ALL DIRECTIONS  
Convertible to ALL ATTACHMENTS

Shovel... Clamshell  
Dragline... Trencher  
Magnet... Pipe Driver  
... Back Filler

## UNIT CRANE & SHOVEL CORP.

Address: 6309 W. Burnham St., Milwaukee 14, Wis.



MILWAUKEE 14, WISCONSIN, U.S.A.

A 5005-1PCU-R2

## Pile Dike Protects Caving River Bank

**A Floating Rig Drives Timber Piles Through Woven Lumber Mats; Stone Ballast and Bank Paving**

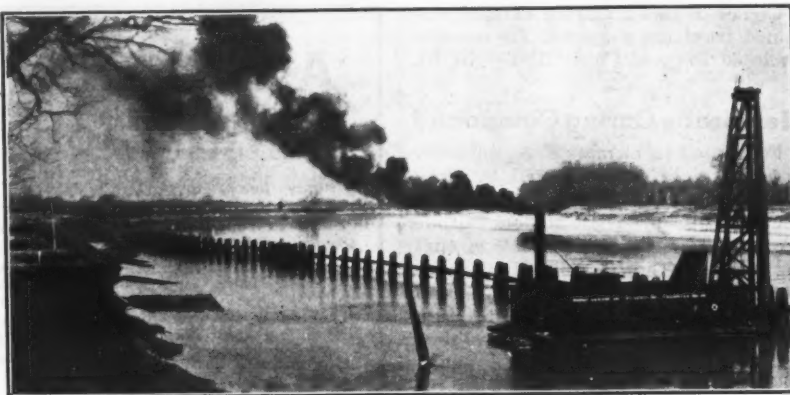
† ALONG the Red River in central Louisiana the soil is often referred to as having the consistency of granulated sugar. This geologic characteristic plays havoc with the river banks, caving and undermining them in unpredictable fashion. The results of the banks being gouged out and eaten away by the waters are obvious. A particularly bad example occurred along the right bank at Bertrand, La., about 14 miles above Alexandria at mile 139 on the Red River.

At this point the river, from 700 to 900 feet wide, is flanked on the right bank by an earth levee. The levee is no more than 150 feet back from the river, while almost on the land-side toe of this levee are the main-line tracks of the Texas & Pacific Railroad. About 200 feet farther back is the concrete pavement of State Route 20. Thus the economic consequences of bank caving are extremely serious. If the erosion were not arrested, the levee would have to be set back, a costly project in itself. And in this case no room would be available without also relocating the railroad and the highway. Such work would really run into big money.

These costly alternatives were prevented when the Corps of Engineers, New Orleans District, designed a pile-dike revetment system and had the Hough-Cowgur Co., Inc., of St. Louis, Mo., construct it at a contract low-bid price of \$146,000.

This bank protection was completed in March. It consists of five pile dikes driven through woven lumber mattresses placed along the length of the dikes. The mats are held in place along the river bottom by stone ballast which is also used for bank paving above the water level.

Work was started the middle of last October on what, under perfect conditions, would have been about a six-weeks' job. But conditions along the Red River, where the waters have risen as much as 12.4 feet overnight, are far



U. S. E. D. Photo

This view upstream on Dike No. 1 of the Corps of Engineers pile-dike revetment system shows the Hough-Cowgur floating pile driver No. 36.

from perfect. Shortly after the job got under way work had to be suspended on November 8; it was not resumed until December 6. Then after one week's progress the job was shut down, started again on January 14, closed on January 18, and resumed again on Jan-

uary 31. The best progress was made during February when normal river stages prevailed.

Despite the rapid rise of the river on several occasions, no mats were lost. But because of the uncertainty of the work, the contractor experienced diffi-

culty in retaining an adequate work force when the weather and the river permitted construction to proceed.

### Pile-Clump Dike

This revetment system consists of five separate pile-clump dikes projecting out into the river from the right bank. Dike No. 1, known as the main or trail dike, is upstream of the others. It runs longitudinally with the current, parallel to and about 100 feet out from the bank. It has a total length of 1,250 feet. The remaining dikes, Nos. 2, 3, 4, and 5, extend out laterally from the bank 230 feet into the river at a small angle downstream to the channel.

All the dikes are tied in to the bank by what is known as a root-section dike. This prevents erosive action around the shore end, with subsequent flanking of the dike itself. The distance between the center lines at the root sections of Dikes 1 and 2 is 2,000 feet. This distance is great because of the longitudinal position of Dike 1 with respect to

(Continued on next page)

**A Model**

**FOR EVERY TYPE JOB**

Your choice of three different types (1) Shell (2) Perforated (3) Basket, in three weights: Heavy, Standard and Feather-weight. All buckets of all welded construction.

Regardless of what model you use, when you use a YAUN, every trip carries a full load. Operators prefer YAUN buckets because they handle easier, dump faster and cleaner. There is no lost motion with a YAUN. For the next job, be sure, save money, and order a YAUN.

Details and prices from dealers or direct from

# YAUN

DRAGLINE BUCKETS AND MFG. PLANT

BATON ROUGE, LA.

**Shunk**  
Superior Quality  
**BLADES**  
AND CUTTING EDGES

For any make of machine  
Motor Graders, Motor  
Scrapers, Drag-  
dozers, Backhoes,  
Wagon Scrapers, Trail  
Builders, Trail Blasters,  
Corryalls, Also—

CUTTING EDGES  
WEARING EDGES  
BACK SLOPES  
EXTENSION BLADES  
MOLDBOARDS  
and  
SCARIFIER TEETH

30 years of manufactur-  
ing blades has developed  
for you a special steel  
milled through our own  
rolls and forged at the  
edges to give that same  
wearing quality you need.

All widths, lengths, and  
thicknesses. **STOCKED**  
ready to fit your machine.

Consult your internation-  
ally recognized Blade Spe-  
cialist. Write for special  
bulletins, giving type and  
name of machine you  
operate—get set for Blades  
only.

**Shunk**  
MANUFACTURING  
COMPANY  
Established 1854  
BUCYRUS, OHIO.





U.S.E.D. Photo

Piles are driven on Dike No. 1, the main or trail dike upstream of the others. It runs longitudinally with the Red River current, parallel to and about 100 feet out from the bank.

## Pile Dike

(Continued from preceding page)

the bank. The intervening distance between the center lines of Dikes 2, 3, 4, and 5 are respectively 535, 480, and 565 feet.

Dike No. 1 consists of a triple row of pile clumps connected by a double row of pile stringers. The other dikes start out as a double row of pile clumps connected by a single row of pile stringers. When deeper water is reached, however, these dikes are strengthened by an additional row of pile clumps and another row of pile stringers.

The clumps are made by driving the piles from 12 to 18 inches apart on centers, and then pulling them together at the top and lashing them in a cluster with wire cable. In the 2-row dike the clumps are 15 feet on centers, while in the 3-row dikes they are on 18-foot centers. Each row of clumps is staggered with the clumps in the adjoining row, and the stringers are lashed to the piling from 3 to 5 feet below their tops.

The piles are driven through a woven lumber mattress which was first laid on the riverbed and held there by stone ballast. The purpose of the mat is to prevent scour of the riverbed around the piles, while the pile dikes are supposed to take the force of the current as it sweeps around a bend in the river. They absorb the shock of the swiftly moving waters, and deflect the current away from the caving banks so that it will be contained in the channel at mid-stream.

### Root Dikes

Before the root-dike sections were constructed to tie the revetments to the shore, the banks were first graded by a P&H Model 855B dragline with a 75-foot boom and a Hendrix 2-yard bucket. From mean low water at elevation 55.0 to the top of the banks the concave slopes were laid back on a 3 to 1 gradient. The dragline worked along the top of the slopes, casting the excavated material into an old borrow pit which had been used in building the river levee. In this way the banks were made ready for the mattress placing which began 3 feet above the water line.

Along the bank the mattresses at each pile dike are 105 feet wide, and extend 86 feet out into the stream before they narrow in width. Dike 1 narrows down to an 89-foot width for the rest of the mattress length, while in the other dikes the mat is reduced to 77 feet wide.

The piles do not run up the middle of the mats. On Dike 1 the mat is 55 feet wide on the stream side of the piles and 34 feet on the bank side. On the others the distance from the piles to the upstream edge of the mat is 25 feet; the remaining 52 feet of mat is on the downstream side. On the bank, though, the root piles are in the center of the mat. By offsetting the mat in this way it is felt that greater stability will be given

the structures where it is most needed.

### Mattress Weaving

As much mattress lumber as possible was procured from various local lumber mills. But the contractor had to bring in five carloads from his St. Louis headquarters to complete the job. Green lumber was used since it is more flexible and easily woven.

The mats are made from 1 x 4's, woven in one-board thickness except at the shore end; there two rows of cribs are constructed to hold stone. The cribs are 10 x 8 feet in size and have a depth of 8 inches, made by cross-lapping four boards in each direction. The cribs or pockets are built up above the level of the rest of the mat but are woven as an integral part of it.

The mat itself is of simple design. One set of boards called weavers are laid out on 4-foot centers running lengthwise of the dike. The cross pieces, known as mattress boards, are woven under and over the weavers and are secured to them at each intersection

with a tenpenny nail. Although the lengths of the pieces of lumber vary, all laps extend at least 15 inches.

All the weaving was done on barges made up of various numbers of pontoons. The pontoons were steel rectangular floats, 40 feet long x 15 feet wide x 3 feet deep, which were lashed together to form a barge of any desired length. On the deck of each pontoon two 60-pound rails were mounted. The

rail sections were 30 feet long and were placed 8 feet apart with one end raised 30 inches above the deck. The raised end was supported on a 3-inch pipe welded to the deck, while the low end was welded directly to the deck. When weaving the 105-foot mat, seven pontoons were joined together with fourteen work rails available on which the mat was fashioned. Only five pontoons,

(Continued on next page)

**MARVEL**

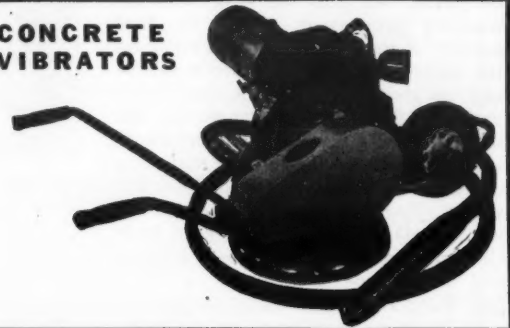
**CONCRETE VIBRATORS**

also  
Asphalt and Tar Kettles  
Portable Hoists  
Generator Sets  
Utility Saw Rigs  
Utility Torches

WRITE FOR DETAILS

**Marvel Equipment Company**

224 S. Michigan Avenue  
CHICAGO 4, ILLINOIS



## BREAK IT UP FASTER WITH BLUE BRUTES



### KNOW YOUR

## BLUE BRUTES

Your Blue Brute Distributor will be glad to show you how Worthington-Ransome construction equipment will put your planning on a profitable basis.

### RANSOME EQUIPMENT

Pavers, Portable and Stationary Mixers, Truck Mixers, Pneumatic Placing and Grouting Equipment and Accessories.

### WORTHINGTON EQUIPMENT

Gasoline and Diesel Driven Portable Compressors, Rock Drills, Air Tools, Self-Priming Centrifugal Pumps and Accessories.

### WORTHINGTON



Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division, Holyoke, Mass.

Your bids for jobs involving paving breaking carry extra profit margins when you have Blue Brute Compressors and Air Tools lined up for the work. Utility pipe lines . . . street construction and repair . . . are "naturals" for these Blue Brute Teams.

Look at Blue Brute Compressors — hard-muscled "portable cyclones" that take the roughest going . . . and come back for more. They develop full rated output right through the grind . . . and have plenty of reserve for the hard pulls. Yes, Blue Brute stamina is built in . . . full force-feed lubrication in engine and compressor . . . Feather\* Valves for efficient air control and less maintenance . . . 3-point suspension of engine and compressor in a unitized

housing cushions shocks and vibration . . . New Fuel Saver accurately regulates fuel according to demand — gives you the most air from each gallon of fuel.

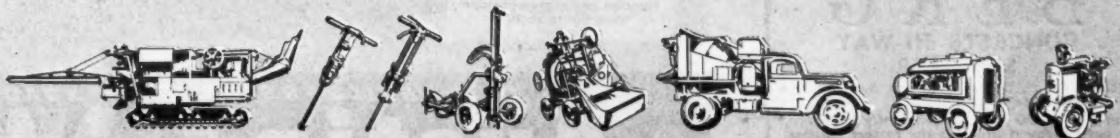
Investigate Blue Brute Paving Breakers, matched partners for Blue Brute Compressors: WB-50 — a fast middleweight for the lighter jobs; WB-81 — a rapid fire heavyweight that packs terrific power; WB-85 — a super slugger that tears into anything.

For a combination that will keep you consistently ahead of schedule — and competition — go to your Blue Brute distributor. He'll show you the models best suited to your jobs . . . and prove to you there's more worth in Worthington-Ransome.

H7-4

\*Trade Mark Registered

## BUY BLUE BRUTES



IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB



## Pile Dike

(Continued from preceding page)

with a total of ten rails, were necessary for the construction of the 77-foot mats.

The pontoon barge was brought up close to the bank and moored to it with 200 feet of 1¼-inch rope line. This line had a slip knot so that the barge could be pulled out into the stream as the weaving progressed. After the first section of mat was woven together on the barge, the dragline pulled it ashore and up the bank to the assigned elevation. More mat was then woven. As it progressed a tender pulled the barge away from shore, letting the mat slide off down the inclined rails into the water. Two tenders were in use on the job: the 45-foot Pelican powered by a General Motors 165-hp diesel engine, and the 35-foot Mary Ann, run by a Red Wing 110-hp gasoline engine.

As the mat was released, ballast stone was heaped over it in order to sink the lumber blanket and hold it on the bottom. The stone was obtained from the Big Rock Stone & Material Co. at Little Rock, Ark., and shipped in gondola cars to the Texas & Pacific Railroad siding at Boyce, La. The railroad cars carried from 45 to 65 tons of material.

At Boyce the stone was unloaded by hand and hauled 3 miles to the site in Ford and International trucks holding from 4 to 6 tons each. The trucks backed down a ramp to the edge of the river and unloaded their contents onto two steel rock barges, the H. C. 102 and the H. C. 104, measuring 100 x 24 x 5 feet deep. The tenders maneuvered the barges into position; there they were anchored and their contents dropped overboard by hand.

The mattress stone for ballasting and sinking the mat weighs 100 pounds to the cubic foot, with the pieces ranging from 10 to 100 pounds. Not more than 20 per cent of the stone was permitted to weigh more than 75 pounds per piece, and a like amount could not weigh less than 25 pounds per piece. For every 100 square feet of mat, or over an area measuring 10 x 10 feet, ¾ ton of stone was dropped.

The bank was paved with riprap which was also used to fill in the cribs or pockets in the upper sections of the mat. The stone extends from mean low water right up to the top of the bank with an average thickness of 10 inches. This riprap also met certain gradation requirements, with 60 per cent of the material weighing from 25 to 75 pounds each piece, and 30 per cent weighing from 6 to 25 pounds. The remaining 10 per cent was composed of spalls less than 6 pounds in weight.

### Pile Driving

The Hough-Cowgur floating pile driver No. 36 was towed down the Mississippi River from St. Louis, and then up the Red River to the project site. Two weeks were required to get



U. S. E. D. Photo

On Dike No. 5 mattress-weaving operations are under way. The purpose of this woven lumber mat is to prevent scour of the riverbed around the piles. It slides off the inclined rails of the pontoon barge into the water, and is heaped with ballast stone to sink and hold it.

the rig up the 139 miles of Red River because of extreme low-water stages.

The No. 36 consists of a steel barge,

70 x 24 x 4 feet deep, equipped with 65-foot steel leads at the bow to hold the piles and a Vulcan No. 2 hammer.

Steam power is supplied by a Broderick 120-hp coal-burning boiler near the stern. Two American steam-driven 2-drum hoists are used to work the driver. One hoist picks up the piles and raises the hammer with its two drums. The other steers and swings the craft with a 450-foot steel ¾-inch cable running from each of the two drums. Both lines leave by the stern, one to an anchor in the river, and the other usually to one of the piles already driven. At the bow of the rig is an American 1-drum steam winch for clumping the piles.

Creosoted piles were supplied to the contractor from Government surplus stock. They were 62 to 64 feet long with 6 to 8-inch tips, and 14 to 18-inch butts. A penetration of 28 to 32 feet was achieved by a combination of jetting and driving, with the final 2 feet done by driving alone. The piles were floated alongside the driver in rafts, and an average of from 30 to 40 piles were driven in a 10-hour day under favor-

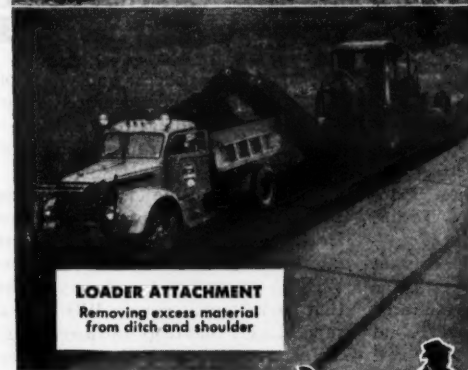
(Concluded on next page)



**ROAD MIX**  
All wheels miss the windrow



**FINISHING**  
Blade extends 10 feet, 3 inches beyond rear wheel



**LOADER ATTACHMENT**  
Removing excess material from ditch and shoulder



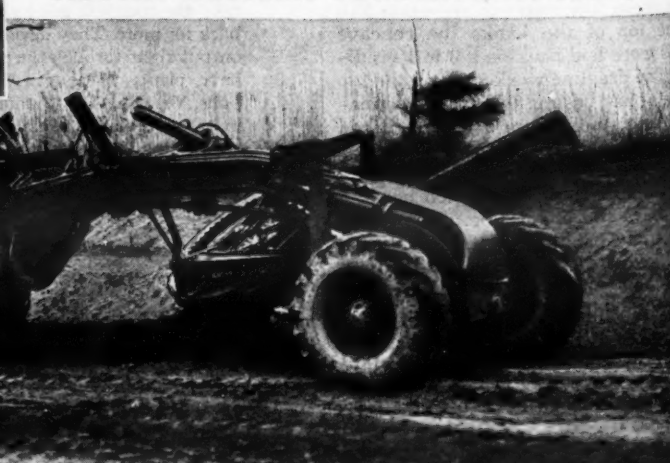
**HIGH-LIFT BLADE**  
Handles any degree of slope from flat to vertical

1947 10th  
IN 1946 FOR THE 9th  
CONSECUTIVE YEAR

no single machine will perform so many highway construction and maintenance jobs so well as the 99-H Power Grader.

With its ALL-WHEEL DRIVE, ALL-WHEEL STEER, HIGH-LIFT BLADE, and other outstanding features, and with its full line of Attachments, the 99-H pays maximum dividends day in and day out, year in and year out. Yes, it can be truly said—the 99-H is the Power Grader THAT HAS EVERYTHING.

AUSTIN-WESTERN COMPANY, AURORA, ILL.



BUILDERS OF ROAD MACHINERY

**Austin Western**  
SINCE 1859

Be wise!  
Economize!  
Road surfacing's  
EASY with your  
Good old faithful

**BERG**  
CONCRETE HI-WAY  
SURFACER

OLD? Yes! . . . The BERG has been on the market since 1924.  
But NEW, TOO . . . constantly improved, until today it provides the fastest, easiest, most effective, most economical method available.

The CONCRETE SURFACING  
MACHINERY COMPANY  
4805-4809 Spring Grove Ave. Cincinnati, Ohio





U. S. E. D. Photo  
Looking downstream on 1,250-foot-long  
Dike No. 1, we see part of a root-section  
dike which ties it into the bank.

## Pile Dike

(Continued from preceding page)

able river conditions. Both the stone blanket and the wooden mattress were pierced as the piles were driven so that their tops were left at elevation 72.0.

The clumps of piles have a spread of about 10 feet at the bottom. But their tops were pulled together and secured with seven turns of  $\frac{3}{8}$ -inch galvanized cable. Each turn was fastened by a boat spike. In addition to the steam winch on the driver, clumping was also done with a hand winch on a small barge. At the end of each dike, 18 piles were driven closely together in a rough square to form a terminal for the revetment. This entire cluster was then clumped together.

A single row of piles was also driven up the bank along the center line of the root dike on 6-foot centers. Between the staggered piles a 1-pile stringer was then hung. All the root-dike piles had a penetration of at least 6 feet; penetration of piles on the dike proper was from 20 to 30 feet. These piles varied in length according to the slope.

### Quantities and Personnel

The major items included in the pile-dike revetment contract were:

Excavation	50,000 cu. yds.
Lumber mattress in squares	230,000 sq. ft.
Stone on mattress and in dike	3,000 tons
Stone in upper bank paving	2,600 tons
Piling	68,000 lin. ft.

An average force of 42 was employed by the Hough-Cowgur Co., Inc., under the direction of A. L. Jenkins, General Superintendent. These included an office manager, 3 foremen—one each for mat laying, pile driving, and material handling, 2 motorboat operators, 1 crane operator, 2 pile-driver engineers, 2 winchmen, 1 fireman, 1 oiler, 6 weavers, 5 carpenters, 1 watchman, and 17 laborers.

Supervising the contract for the Corps of Engineers was H. E. McDowell, in charge of field headquarters at Alexandria. The New Orleans District is headed by Col. John R. Hardin, District Engineer.

### Line of Arc Welders

A line of ac arc welders is made by the Miller Electric Mfg Co., Appleton, Wis. Models 61, 62, 63, and 64 are designed for general welding and maintenance service, where the duty cycle is low. The company also produces six models for continuous production and automatic welding applications. Welding can be accomplished in vertical, overhead, horizontal, or flat positions.

For operator safety, Miller has developed an automatic voltage reducer, to prevent full open-circuit voltage from remaining on the welding leads when the arc is not in use. According to the manufacturer, the voltage on the leads is instantaneously reduced to 30

volts when the arc is broken, and full voltage is not re-established until the arc is struck. At no time, it is claimed, is the operator subject to more than 30 volts, should he contact electrode holder and work material.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 36.

### "Decal" Identification

A rapid and uniform means of identifying or marking equipment is by the use of decalcomanias. One manufacturer of this type of material is Superior Decals, Inc., Ft. Worth Ave. at Westmount, Dallas 11, Texas.

The company points out that Super-Cals are made entirely of du Pont Dulux synthetic enamel, 0.004 inch thick. It states that this extra thickness allows for ease of handling and reduces waste at the time of application.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 48.

## Perk Up Engine Performance

You know that when lime-scale and rust accumulate to excess in gasoline and Diesel engine radiators your power plant is heading for trouble.

To counteract this common cause of "below-par" engine performance descale with Oakite Compound No. 32. By completely eliminating scale, rust and similar foreign matter, this effective Oakite acid dissolvent quickly restores operating temperatures to normal and helps to increase engine life span, assists in keeping maintenance costs low.

The services of a conveniently located Oakite Technical Service Representative are freely available. He'll be glad to show you the simple, low-cost Oakite way to descale your power units. Call him today. Or write us direct for full details. No obligation either way.

OAKITE PRODUCTS, INC.

72 Thomas St., NEW YORK 6, N. Y.  
Technical Service Representatives Located in  
Principal Cities of United States and Canada

**OAKITE**

MATERIALS  
METHODS  
SERVICE

*Specialized Industrial Cleaning*

## Powered to Build Better Profits . . .

# ADVANCE-DESIGN CHEVROLET TRUCKS

### WITH THE CAB THAT "BREATHES"

America's first ADVANCE-DESIGN trucks, featuring the larger, roomier cab that "breathes"! The unique new cab almost-literally "inhales" fresh air and "exhales" used air,\* assuring day-long driver comfort and efficiency. Other new features and innovations make these the trucks to see first at your Chevrolet dealer's!



Extra-economical and powerful Chevrolet VALVE-IN-HEAD ENGINES are time-savers, profit-makers! There are exclusively designed HYDRAULIC TRUCK BRAKES, too, with greater brake-lining contact for quick, safe stops!



Better load distribution, due to LONGER WHEELBASES. FULL-FLOATING HYPOID REAR AXLES mean extra pulling power! They're geared for the load!

\*Fresh-air heating and ventilating system optional at extra cost.



More efficient loading in stake and high rack bodies—more LOAD SPACE in panels and pick-ups. Chevrolet truck FRAMES are new, stronger and sturdier, designed to carry greater loads for a longer time!



**CHEVROLET TRUCKS**

FOR TRANSPORTATION  
UNLIMITED



CHEVROLET MOTOR DIVISION, General Motors Corporation, DETROIT 2, MICHIGAN

Your Chevrolet dealer can supply standard or special equipment for your specific hauling needs.



## Convention Calendar

### Sept. 22-26—AASHO Meeting

Annual meeting, American Association of State Highway Officials, Waldorf-Astoria Hotel, New York City, N. Y. Hal H. Hale, Executive Secretary, 1220 National Press Bldg., Washington 4, D. C.

## Terrain Maps Serve As Road-Design Aids

A terrain classification based on land forms, texture, and drainage is advocated as an aid to solving highway engineering problems. This subject was recently discussed by F. R. Olmstead, Senior Soils Specialist of the Public Roads Administration. He spoke before the Seminar of Engineering Geology conducted by the U. S. Geological Survey. Mr. Olmstead showed that engineer problems, construction experience, design recommendations, and pavement behavior can be related to the engineering terrain maps.

The need to develop an engineering classification of terrain related to parent material, relief, and climate is obvious, said Mr. Olmstead. Future highway research must pass from the laboratory to the field to study existing pavement behavior under actual climatic and traffic conditions. The experienced highway engineer knows that many highway engineering problems cannot be solved by laboratory test data alone; that in some cases, the engineering problems are related directly to environmental factors; and that in many cases the engineering problems are related to both the physical properties of the materials and environmental factors.

The tentative classification suggested may require modification for other types of landscapes, said Mr. Olmstead. The ultimate objective of an engineering terrain classification should be to prepare engineering maps for an area as large as a state. From these, the engineer will be able to develop a regional concept of his engineering problems; he can use systematic planning for all types of roads.

Methods of making these terrain maps have been developed which should be satisfactory. They are based upon air-photo interpretation together with the use of geologic and pedologic information. They are supplemented by limited ground reconnaissance and laboratory testing.

The maps should help engineers solve highway problems such as these: (1) The location of sources of local granular materials suitable for construction purposes, or areas in which granular materials are most apt to be found for the construction of sub-bases, base courses, and wearing courses. (2) Areas which are likely to contain binder soils suitable for the stabilization of aggregate bases or wearing courses. (3) Areas likely to require special compaction during subgrade or embankment construction. (4) Areas which usually have adverse ground-water conditions

such as high water table or excessive seepage of ground water in deep highway cuts. (5) Areas which have low subgrade support and require excavation and backfilling with selected earth borrow, or the use of sub-bases to reinforce the standard cross sections normally used for current construction of road types. (6) Areas in which bed-

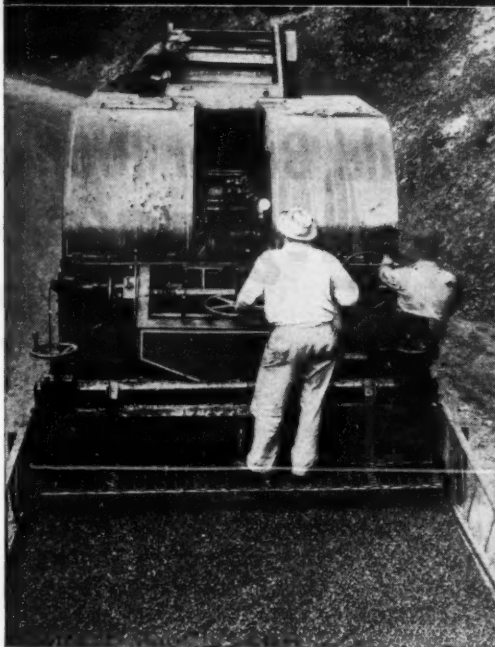
rock or material difficult to excavate during construction influence the selection of grade line. (7) Areas in which subsurface geologic structure and topographic position are likely to result in landslides. (8) Areas in which erosion may be a major engineering problem to consider during the design of cut or embankment slopes.

## New M-R-S Co. Salesmen

Four district sales representatives have been appointed by the M-R-S Mfg. Co. of Flora and Jackson, Miss., maker of the Mississippi Wagon. They are: Thomas Q. Hathorn, Hollis H. McBride, Charles Robert Morris, and Harper Hughes Spragins.

At Right: Moto-Paver mixing and laying retread pavement over old bituminous macadam in West Virginia.

Below: Rear view showing positions of the men usually used in operating the Moto-Paver.



For resurfacing secondary roads and city streets...  
Also for new construction

● The H & B Moto-Paver is especially adapted for resurfacing secondary roads and city streets, but is also highly efficient on new construction. Here, for the first time, is a self-contained, single-unit machine which accomplishes the entire mixing and laying job in one continuous operation. The Moto-Paver delivers the mixed material spread and struck off on the road surface, ready for rolling. Paving width is adjustable from 8'6" to 12'0", and thickness up to a maximum of 7". The strike-off blade is

adjustable to hold accurately to specified grade and crown.

The Moto-Paver has been successfully operated using gravel, stone or slag aggregates, and with most types of emulsions, RC, MC, and SC asphalts and tars. Illustrated bulletin giving complete information and specifications will be sent on request.

**HETHERINGTON & BERNER INCORPORATED**  
731 KENTUCKY AVENUE, INDIANAPOLIS 7, INDIANA



## PONDEROUS EQUIPMENT

ROGERS BROTHERS CORPORATION  
108 ORCHARD ST. ALBION, PA.

on ROGERS HEAVY DUTY TRAILERS

EXPERIENCE Sells 'em  
PERFORMANCE Sells 'em

## Change of Address

(Mail to Contractors and Engineers Monthly, 470 4th Ave., New York 16, today)

From \_\_\_\_\_ (Former address)

To \_\_\_\_\_ (New address)

Name \_\_\_\_\_

Firm \_\_\_\_\_

Position \_\_\_\_\_









C. & E. M. Photo  
This Northwest No. 4 37-ton crane with a 50-foot boom, 51½-foot steel leads, and a Vulcan No. 1 single-acting steam hammer, drives a concrete batter pile for the new Altamaha River crossing.

## Three New Bridges

(Continued from preceding page)

Other 2 x 6's crisscrossed these on top at the same spacing. Wooden wedges were inserted between the upper 2 x 6's and the 2 x 8 bottom form to fix the latter firmly in place.

Near-by, the reinforcing cages were assembled on pedestals made from discarded truck wheels and axles set vertically into the ground. When completed, they were swung into position on top of the 2 x 8 by a Northwest crane with a 40-foot boom. Three-sided steel forms in two sections, 10 feet long, were then built around the reinforcing which rested on small concrete bricks. The upper side was left open to admit the concrete. The steel forms were removed after 24 hours and on each pile was painted in black figures its length and the day it was cast. Truscon Tru-Cure compound was sprayed on the sides as a curing agent, but the piles were not moved from the beds for at least 7 days and had to be 21 days old before they were driven.

The piles were picked up by the crane with a 3-point lifting device; this consisted of two 3-inch angles back to back 35 feet long, from which hung three sets of steel grapples shaped to the cross section of the piles. One grapple was at the center and the others were placed 0.2 of the length of the pile from each end. They were put on a wooden skid platform and hauled to their driving site by a Caterpillar D7 tractor. This method eliminated any shocks or strains that might have resulted had they been snaked along the ground to the driving spot.

The three inner piles of the 5-pile bents are vertical, while the outer piles are battered 1½ inches to the foot; the tops of the piles within the bents are set on 6-foot 3-inch centers. To set the piles precisely, a template of two 12 x 12's was first laid out on the ground. Then the plumb piles were all driven, followed by the batter piles.

Most of the driving was done with a Northwest No. 4 37-ton crane with a 50-foot boom from which were suspended 51½-foot steel leads. While in the river flats, the crane worked on timber mats which were pulled around by a Caterpillar RD7 tractor.

Jetting was necessary at the start to get the pile tip in the ground in order to provide enough room within the leads for the hammer. Water for the jetting was pumped from the river by a Jaeger 4-inch pump with the line reduced to 1½ inches at the jet. The jet was raised and lowered on the leads by means of a CMC hoist driven by a Continental air-cooled 4-cylinder engine

located at the front end of the crane. With the weight of the pile and the 200-pound water pressure, a seat was readily obtained in the ground. Then the hammer went to work driving.

A Vulcan No. 1 single-acting hammer with a 3-foot fall was used in this rig, driven by a 30-hp coal-burning vertical boiler. A 1,000-gallon tank, kept filled with water pumped from the river, supplied the boiler. Piles up to 55 feet were driven with this equipment. For the longer piles up to 62 feet, a larger Northwest No. 6 50-ton crane was used, equipped with a 72-foot boom and 78-foot steel leads. Penetration varied between 20 and 30 feet. A single driver averaged 8 bents a week.

### Form Work

As the pile bents were driven, the individual piles were straightened and pulled into exact alignment with a steamboat ratchet. Then a 6 x 8 was clamped along each bent near the tops of the piles to support the cap forms. These timbers were fastened together

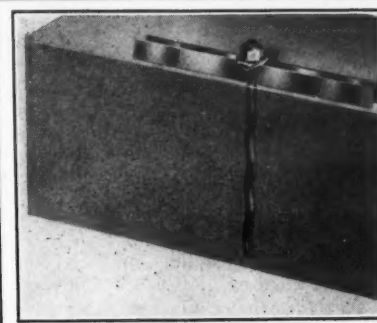
by Richmond Tyscrus and held to the piles by skin friction. Across the 6 x 8's were laid 2 x 6 stringers on 18-inch centers to support the 1 x 6 flooring for the bottom of the caps.

The cap forms were next constructed 2 feet 3 inches high x 2 feet 6 inches wide x 28 feet long. The contractor used ¼-inch plywood as liner for the assorted stock, which was backed with 2 x 6 studs on 16-inch centers. At the

bottom of the forms a 2 x 6 wale was secured with Richmond ties, while across the top a 1 x 3 batten was nailed on 18-inch centers. The piles extend 9 inches into the caps.

The deck forms were supported on three 5-pile timber bents to every 32-foot span. The piles were native posts averaging 30 feet in length with 8-inch butts and 4-inch tips. They were driven

(Continued on next page)



### Anchor Tie Form Aligner

1. Locks wall form in accurate alignment.
2. Requires no skilled labor for setting pig-tails in the footing.
3. Alignment bars may be attached later and set to a chalk line.
4. Anchors wall to footing and may eliminate the necessity of key-ways.

12c for an 8 inch wall width  
½c for each additional inch of wall width

**Williams Form Engineering Corp.**

Box 925, Madison Square Station  
Grand Rapids 7, Michigan



## His Sense Saved My Dollars!

Talk about a money-saving idea, this one that my Oliver "Cletrac" dealer suggested really takes a prize! We were doing the dirt moving on this ground-leveling job, and what with high costs and weather troubles, were getting a little worried about both time and money.

Our Oliver "Cletrac" man came out to look over the job one day, and I did a little high-class beefing about the whole thing. Then he popped this one. "Why not build a sunken loading platform to load out the trucks?" he asked. "Then your tractor-scraper unit can haul the dirt up on the platform and dump it through an opening into the truck body. You'll eliminate a shovel and save a lot of time that way, and time is money these days."

It was a darn good idea—one we just had overlooked. We went to work on it right away and believe me, it really saved our hides. That Oliver "Cletrac" man sure knows the dirt-moving business and he's a good man to know!

# Cletrac

a product of

The OLIVER Corporation

**OLIVER**  
**Cletrac**  
**SALES**  
**SERVICE**

"THE SIGN OF EXTRA SERVICE"





C. &amp; E. M. Photo

Bridge form work was speeded up by the use of a CMC 12-inch circular-blade table saw driven by a gasoline engine.

## Three New Bridges

(Continued from preceding page)

through successive layers of sand-clay, coarse sand, and gravel to a 10-ton bearing capacity by a Union Iron Works 2,000-pound drop hammer working in wooden leads hung from the smaller Northwest crane. Rough-cut 2 x 6's were used for cross bracing on the posts which were capped with 8 x 8's, 18 feet long, thus requiring a splice at the center. Across the caps five sets of double 4 x 10 stringers were laid to support each of the five girders in the superstructure. The two paired stringers were on 18-inch centers, while the sets were on 6-foot 2-inch centers.

On top of these stringers 2 x 4's were placed on 16-inch centers to support the girder bottoms consisting of two 2 x 8's separated by a 2 x 4. This made a floor 20 inches wide. And since the girders are 18 inches in width the extra margin made the side-wall construction that much easier. The beam sides were constructed of 3/4-inch stock usually in 5 1/2-inch width. Between the beams, 1 x 4's on 3-foot centers were used for cross bracing, with a 2 x 4 kicker running along the bottom.

The five beams vary in depth from 2 feet 3 3/4 inches to 2 feet 5 inches; this includes the 7 1/4-inch slab thickness. The 28-foot roadway has a 1 1/2-inch circular crown and is flanked by a 14-inch curb with a 2-foot walk on each side. The great amount of form work was speeded up by the use of a CMC 12-inch circular-blade table saw driven by a gasoline engine.

### Concrete Batch Plant

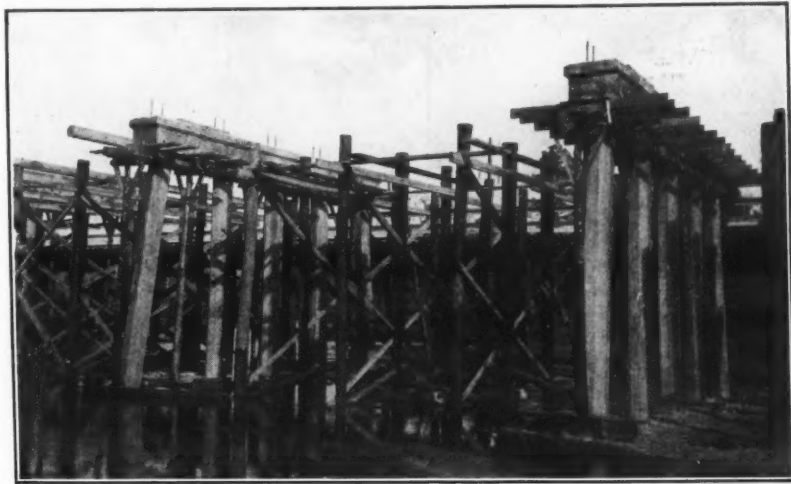
The concrete batch plant was set up on the bluff on the south bank of the river, near the approach to the new bridge. As a precaution against material shortages, great mounds of sand and gravel, 750 to 1,000 tons each, were stockpiled at the plant and separated by a wooden barrier. The Roquemore Gravel & Slag Co. of Montgomery, Ala., furnished the gravel, shipping it over the Southern railway to Baxley, Ga. There it was unloaded from hopper-bottom cars by a Burch unloader and hauled the 12 miles to the plant in Ford

and International trucks.

Gravel was used as the coarse aggregate in all the substructures, while stone was employed in the superstructure construction. The stone was purchased from the Georgia Materials Co. at Thomasville, Ga., and shipped to the batch plant in the same manner as was the gravel.

Sand for the project was supplied by the Dawes Silica Mining Co. of Thomasville, Ga., which opened a pit of suitable material on the job site adjacent to bridge 2. The hole filled quickly with ground and rain water, thus permitting the sand to be pumped out hydraulically by a Georgia Iron Works 6-inch centrifugal pump powered by an Allis-Chalmers 4-cylinder gas engine.

The sand was pumped through a pipe to the top of a 22-foot-high platform. There it passed through a 6-foot-long x 3-foot-diameter rotary screen to remove any gravel bits larger than 1/4 inch. From the screen the sand slid down a 6-foot-long steel chute to a tank where it was washed. The larger



C. &amp; E. M. Photo

This view of bridge No. 2 on the Altamaha in Georgia shows the falsework between two of the 5-pile bents. Scott Construction Co. was the contractor.

metal slid down another chute to the ground; the surplus water was carried back to the pond in a trough; while the

sand dropped through a hopper to the ground. There it was picked up by a (Continued on next page)



# LOWER YOUR LOADING COSTS

A truly modern loader that incorporates the latest and best ideas in design, function and control. Conveyorized discharge chute permits lower overhead clearance, (11' 9") and speedier handling of material.

IT DOES THIS

Gets from job to job at truck speed.

Handles any loose material quickly and economically.

WITH THESE

One man operation  
Hydraulic control  
Capacity—3 to 5 cu. yds. per minute  
Positive chain crowd  
Mounts on any standard 1 1/2 or 2 ton truck chassis  
Self feeding augers feed material constantly, efficiently, into 20" buckets.

Write for further information and name of your distributor.



# EAGLE

JAW CRUSHERS • IMPACT BREAKERS  
PULVERIZERS • CONVEYORS • LOADERS

CRUSHER CO., Inc. GALION OHIO-U.S.A

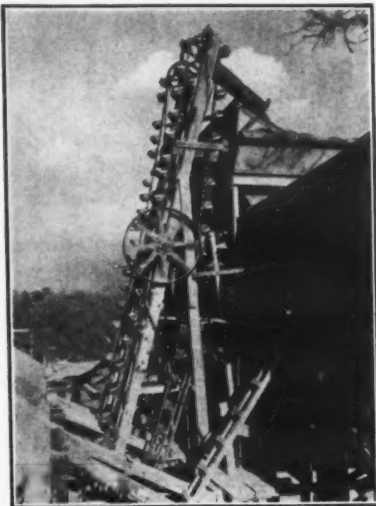
**TRANSITS and LEVELS**  
**HEADQUARTERS for**  
**REPAIRS—any make**

We will buy or trade in old Transits, Levels, Alidades, etc. Send instruments for valuation.

Write for new Catalog CE-38 of Engineering Instruments, Engineering Field Equipment and Drafting Room supplies.

**WARREN-KNIGHT CO.**

Mfrs. of Sterling Transits & Levels  
136 N. 12th St. • Philadelphia, Pa.



C. & E. M. Photo  
Two Chain Belt bucket elevators 25 feet high lift sand and gravel to a Heltzel 15-yard bin at the Scott Construction Co. batch plant.

## Three New Bridges

(Continued from preceding page)

clamshell and loaded to trucks for hauling to the stockpile.

At the stockpiles an International TD-6 tractor-dozzer kept the material heaped against a wooden stockade at one end which had two openings on 9-foot centers. Through these the fine and coarse aggregate was picked up by two Chain Belt bucket elevators 25 feet high, driven by an Allis-Chalmers gas engine. The material dropped into a Heltzel 2-compartment 15-yard bin equipped with a Howe beam scale for

weighing the batches.

Cement was supplied by the Alpha Portland Cement Co. of Birmingham, Ala., and shipped in bags via the Southern railway to Baxley. From there it was hauled by trucks to the 2,000-bag cement-storage shed adjoining the aggregate bin. On the other side of the bin was a 1,000-gallon water tank for the mix; the water was pumped from the river through 500 feet of 2-inch line by a Deming 2-inch electric pump operating on a 5-hp motor.

The concrete was mixed in two Jaeger 2-yard truck-mixers mounted on International K56 trucks, which backed under the materials bin and received both fine and coarse aggregate, water, and cement without further shifting about. These truck-mixers carried concrete for the whole job and, according to the pour, either chuted directly into the forms or into buckets which were handled by the cranes. Two Master vibrators were on the job for vibrating the concrete.

The dry weights of a 2-yard batch and the gradation of the gravel and sand are as follows:

Cement (13 bags)	1,222 lbs.
Sand	2,405 lbs.
Gravel	3,692 lbs.
Water	78 gals.

Sieve Size	Per Cent Passing	
	Gravel	Sand
1½-inch	100	....
1-inch	93	....
¾-inch	47	....
No. 3	....	100
No. 4	....	98
No. 8	2	....
No. 16	....	81
No. 50	....	10
No. 100	....	1

### River-Pier Construction

Numbering for the substructures on the main river crossing starts with No. 1 for the south abutment and continues

in sequence over the piers towards the north. Abutment 1 is located well back on the river bank. But the next two structures, piers 2 and 3, come in the deepest part of the river and had to be constructed from a barge. Pier 2 is 124 feet from the abutment, and pier 3 is 91 feet farther north. The remaining piers are located in water that is shallow in normal times, and were built from a work trestle constructed nearly 400 feet out in the river from the north bank.

Piers 2 through 17 are supported on 28,000 linear feet of Bethlehem 10-inch 42-pound-section steel H-piling; this was driven through the riverbed or soft clay bottom lands to refusal on the lime rock beneath. It has a 27-ton bearing capacity. Under river piers 2, 3, 4, and 5, which have a concrete seal beneath the footings, the H-piles average 25 to 30 feet in length. Under the other piers, where no seal was necessary, the piles are longer, being 35 to 40 feet.

The piers rest on twin footings. In

the case of the river piers, these are 26 feet 3 inches on centers, while the others are 18 feet center to center. The larger river footings required up to 35 piles each or 70 to the pier, and these piles extend up through the seal to embed 1 foot into the footings. The other piers required fewer foundation piles as they get farther back on higher ground.

The substructure foundations were built within steel-sheet-pile cofferdams driven either from the barge or work trestle. The timber work trestle consisted of 5-pile bents on 10-foot centers, with posts averaging 35 feet in length and having 10-inch butts and 6-inch tips. These were capped with 12 x 12's and crossed with 10 x 12 stringers to support a deck made of rough 3 x 8's.

For the two deep-water piers a 35 x 70-foot steel barge was employed. On it worked a Bay City crane driven by steam generated in a coal-burning boiler. The crane had a 50-foot boom to which a 10-foot extension was fitted (Continued on next page)

## CONCRETE VIBRATION

is  
*Our Meat!*

If you are looking for the best solution to any specific concrete vibration problem, or on the other hand, you simply want the best vibrator your money will buy, see the nearest JACKSON Distributor or drop us a line. Concrete Vibration is our meat!

For over 25 years we have specialized in the development and manufacture of the most efficient and reliable concrete vibrators for each and every type of concrete construction. And the record of JACKSON equipment in the field clearly demonstrates that that goal has been fully attained. The name "JACKSON" on any vibrator is complete assurance of thorough satisfaction.

### The FS-7A ELECTRIC (READY FOR IMMEDIATE DELIVERY)

Ideal on many types of construction. Built around the lightest, yet most powerful motor we have ever used on equipment of this character. Easy to handle or skid. Takes any of our standard heads up to 23½" x 18½" with flexible shafting in 24" to 14' lengths. Delivers up to 10,000 V.P.M. on AC or DC 110-120 Volt. Does many jobs formerly done only with larger machines.

Left: The FS-7A with reduction attachment to provide the most desirable shaft speed for wet or dry rubbing or grinding of concrete.

DESIGNED FOR *Tight Spots*

by the world's exclusive roller specialists. A low pressure, ample capacity hydraulic steering circuit, plus an efficient clutch shifter, insure easy and prompt response to operator's touch. Notice the simplified clutch shifter mechanism illustrated at the right. It is easy to see why Buffalo-Springfield rollers last longer with lower maintenance costs. See your Buffalo-Springfield distributor today.

**BUFFALO SPRINGFIELD**  
THE STANDARD OF COMPARISON  
SPRINGFIELD, OHIO

**JACKSON**  
**INTERNAL-EXTERNAL**  
ELECTRIC-FLEXIBLE SHAFT-HYDRAULIC  
**Concrete VIBRATORS**

**ELECTRIC TAMPER & EQUIPMENT CO.**  
LUDINGTON MICHIGAN





C. & E. M. Photo  
Superintendent Roy Phillips used his Taylorcraft monoplane to transport replacement parts for the Scott Construction Co. bridge job. His dog Fluffy never missed a trip.

into the forms from the bank. But on the higher sections the crane on the barge swung the concrete buckets from the bank, where they were filled by the truck-mixers, and emptied them over the forms. When pier 3 farther out in the river was built, three small work barges were used to bring the concrete buckets from the bank to the crane barge. A light tug did the towing.

#### Quantities and Personnel

The major items in contract 1 of the Scott Construction Co. have been broken down into the three bridges comprising the project; the long 4,088-foot bridge includes the following:

Excavation	4,700 cu. yds.
Steel H-piles	28,000 ft.
Precast concrete piles	19,000 lin. ft.
Treated-timber piling (dolphins)	7,000 lin. ft.
Reinforcing steel	1,570,000 lbs.
Concrete deposited under water	1,220 cu. yds.
Concrete in substructure	2,850 cu. yds.
Concrete in superstructure	4,850 cu. yds.

Bridges 2 and 3, 288 and 352 feet long respectively, contain the following items:

(Concluded on next page)



**Beat Hand Sawing  
Ten to One . . .**

Van Dorn Portable Electric Quick-Saws\* save money, muscle and man-hours on every construction sawing job. They finish jobs ten times faster than by hand. Rip, crosscut, miter, dado. Cut wood, compo-board, slate, tile, marble, asbestos, galvanized sheet. Models for cutting to depths of 2 3/8", 2 1/2", 3 1/8". Ask your nearby Van Dorn Distributor or write for our free "Electric Quick-Saw Handbook" to: The Van Dorn Electric Tool Co., 787 Joppa Road, Towson 4, Maryland.

\*Trade Mark Reg. U. S. Pat. Off.

For Power  
Specify

**"Van Dorn"**

DIV. OF BLACK & DECKER MFG. CO.  
PORTABLE ELECTRIC TOOLS

## Three New Bridges

(Continued from preceding page)

to handle the concrete buckets on the higher pier pours. The Northwest cranes were used on the trestle, and both the steel sheeting and the H-piles were driven by Vulcan No. 2 single-acting hammers. After the cofferdams were finished, they were excavated by Owen clamshell buckets attached to the cranes; either 1 1/4 or 3/4-yard models were used. The H-piles were then driven, and afterwards the seals were poured in the river piers.

The deepest seals go to a founding elevation of 39.0 and are 8 to 9 feet deep; each measures 14 1/2 x 19 1/2 feet. Seal concrete was placed under water by means of a 1/2-yard submarine bucket, 6 feet long x 22 inches in diameter. This bucket was lowered by the crane down between the H-piles to the bottom of the excavation. Then the bottom discharge gate was opened to release the concrete. A 5 to 8-inch slump was kept in the mix so that the concrete would spread readily. A dozen Jaeger pumps, 3, 4, and 6-inch sizes, were on the job for unwatering the cofferdams.

The steel H-piles were then cut off to the proper grade, and to their tops steel bearing plates were electrically welded by a Hobart 300-amp electric welder. A couple of air holes were left in these plates so that the concrete could get right up underneath them, since the piles project 12 inches into the footings. Next the footings were poured, which are stepped in 12 inches from the neat lines of the seal, and to a height of 6 feet above the seal.

The heights of the pier columns vary according to the contour of the river bottom. But they taper to a 3 x 4-foot measurement at the top with their sides battered 1/4 inch in 12. The columns are connected by a web wall, 18 inches thick in the river piers and 15 inches in the others; it extends from elevation 66 to 94.50 to where a window is left in the piers. Above the window the wall is continued to a cap running the length of the pier, 3 feet high x 3 feet deep, on which the steel girders will be placed. After the footings and the lower lifts of the piers were poured, the sheet piling was removed by a Union steam extractor.

Forms for the piers were made of 3/4-inch boards faced with 5/8-inch plywood and backed by 2 x 6 studs set on 12-inch centers and held in place with 6 x 6 wales on 2 1/2-foot centers. Richmond Tyscrus were used throughout the structure, and the Truscon Steel Co. of Atlanta, Ga., supplied the reinforcing.

In constructing pier 2, the lower lifts were poured by chuting the concrete

**THIS ABLE-BODIED WORKER  
NEVER MISSES A DAY!**

**THE MODEL "M" Dorsey  
MACHINERY TRAILER**

*with Built-In* **DURABILITY  
DEPENDABILITY  
ECONOMY**



The rugged Dorsey Model "M" Machinery Trailer does big jobs in a big way! No breakdowns!—no delays!—skilled Dorsey engineering specifies only high-quality materials and master craftsmanship . . . resulting in 3 outstanding features that make Model "M" operation—

**Dependable!**—the Model "M" is always on the job . . . a gold-star workman putting in a full day's work every day for your greater profit!

**Durable!**—the Model "M" takes any hauling job in smooth, easy stride . . . from 15 to 25 tons!

**Economical!**—the Model "M" combines *Durability and Dependability* to give fast, low-maintenance heavy machinery transportation—any and every time you want it!

Ruggedly built for steady service . . . promising a long, uninterrupted work-life . . . The Dorsey Model "M" Machinery Trailer boasts—

**Positive Action Brakes** to assure Passenger Car control—and safety!

**Patented Tubular Trunnion-type Axles** to absorb road shocks and ease wear and tear on the trailer!

**A Frame Sturdily Constructed** to give you year after year of trouble-free service!

Write TODAY for Dorsey Bulletin 8210!

**15 TON  
20 TON • 25 TON**

In the Model "M" group of 15-ton, 20-ton and 25-ton capacities, there is a Dorsey hauling unit well adapted to your requirements. So, to lighten your heavy hauling problem, check today with your nearest Dorsey dealer or distributor. Save—by studying the *Modern Designed Transportation* advantages built into the Dorsey Model "M" Machinery Trailers!

**DORSEY**

**DORSEY  
TRAILERS**

ELBA, ALABAMA, U. S. A.



## Three New Bridges

(Continued from preceding page)

	Bridge 2	Bridge 3
Concrete	450 cu. yds.	550 cu. yds.
Reinforcing steel	118,000 lbs.	144,500 lbs.
Precast concrete piles	3,000 lin. ft.	3,100 lin. ft.

Contract 2 will get under way some time this summer and includes the structural steel in a lump-sum item for the Nashville Bridge Co. to furnish and erect. Contract 3 of the Carlton Contracting Co. calls for 1.59 miles of embankment for a 44-foot roadway on which will be laid a 24-foot concrete pavement. The two major items are:

Excavation	183,293 cu. yds.
Concrete paving, 9-6-9-inch	22,554 sq. yds.

The Scott Construction Co. has employed an average force of 40 men under the direction of Superintendent Roy Phillips. As the bridge site is remote from any neighboring towns, the contractor built four houses on the high south bluff overlooking the river; in these live the superintendent and his foremen with their families. To this community four trailers were added, housing other personnel. The workers are brought back and forth from Baxley in the contractor's new Ford bus.

Superintendent Phillips also had at the job site his 1946 Taylorcraft 2-passenger monoplane. It has proved very useful on occasion when replacement parts were needed which could be obtained only from Savannah, Atlanta, or Augusta. Phillips used the plane to transport such equipment parts, taking off and landing on the 1,200-foot approach fill to the main bridge. He is always accompanied by his dog Fluffy.

For the Georgia State Highway Department, J. Gifford Brock is Resident Engineer. The project is located in Division 5 of which J. O. Bacon is Division Engineer with headquarters at Savannah. The Department is headed by John Beasley, Director, with Warren R. Neal, Deputy and Chief Engineer. C. N. Crocker is Bridge Engineer.

### Scaffolding Bracket

A steel bracket for use in erecting wooden scaffolds is made by the Northwest Tube & Metal Fabricators, 2658 So. E. Tenino St., Portland 2, Oreg. The product is called the Knife-Grip bracket and consists of a bracket and brace. It requires neither nails nor bolts, and no tools except a hammer, says the manufacturer. It will accommodate 2 x 4's or 4 x 4's. The lumber and the brackets can be re-used.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 32.

### Worm-Drive Hose Clamps

An announcement describing its line of hose clamps is being distributed by the Aircraft Standard Parts Co., Inc., Rockford, Ill. Feature of the Aero-Seal line is its worm drive or screw, engaging slots in the band, which is said

to draw the hose down evenly all around and thereby prevent leaks. Leaflet CS-246 describes the clamp, shows how to put it on and tighten it, and lists all sizes and prices.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 85.

### Pumps for Many Purposes

Centrifugal, diaphragm, and plunger-type pumps are described in literature of Marlow Pumps, Ridgewood, N. J. Bulletin M-46 describes the Marlow Mud Hog diaphragm pumps. It lists specifications, features, and other de-

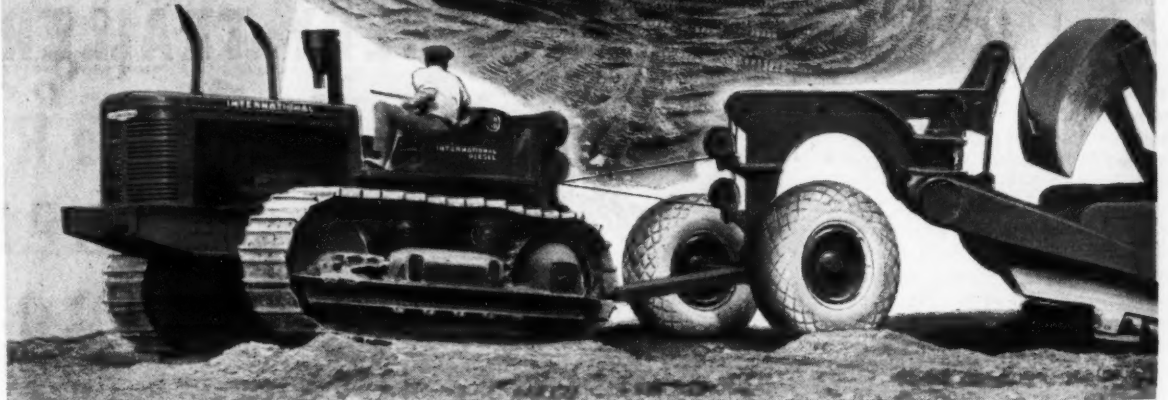
tails of these heavy-duty units.

No. G-46 is a general bulletin describing the basic Marlow pump models. It lists briefly their features and advantages claimed for them.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 88.

*One Man  
moves 100 yards per hour  
with*

**One INTERNATIONAL  
TD-18**



This one-man, International tractor and scraper unit moves 100 yards of earth to the fill in an hour! It's on a big road-building job for a logging company in the mountains of northwest Washington.

The International TD-18 Diesel has the power to lug its matched scraper without assistance, even through this hardpan and gravel. It has the maneuverability and secure footing to handle the load on steep grades as well as on the fill.

A lot of earth gets moved at minimum cost for labor, fuel and maintenance under these circum-

stances. That's why the demand for International Crawlers and matched earth-moving equipment becomes greater and greater every month.

Ask your International Industrial Power Distributor for the interesting facts about this and other tractors in the complete International line. Let him help select the power and equipment you require.

Industrial Power Division

**INTERNATIONAL HARVESTER COMPANY**  
180 North Michigan Avenue Chicago 1, Illinois

**INTERNATIONAL POWER**  
CRAWLER AND WHEEL TRACTORS • DIESEL ENGINES • POWER UNITS

### SAFE FOR THE BIGGEST LOADS

HAULING CONTRACTORS everywhere depend on Jahn Heavy-Duty Trailers for safe, fast and economical moving of their heaviest loads like this 110,000-lb. transformer. Deep, wide flange main beams run the full length of the trailer. Cross-members and outriggers are I-Beam sections. Improved, fabricated gooseneck adds greater built-in strength. Positive, self-equalized braking at each wheel regardless of position of axle assures maximum safety. See your nearest Jahn dealer for details.

**C. R. JAHN COMPANY**

DEPT. 47 - 1106 W. 35th ST., CHICAGO 9, ILL.



Keep On

**BUYING BONDS**

★ ★ ★ ★

**DON'T SKIMP!**



Heavy-duty trailers from 5 to 100 tons



## Cofferdam Driven To Begin Dam Job

### Good Progress Made on First-Stage Diversion Of Heavy Stream Flows At Fort Gibson Dam

EXCELLENT progress is being made on the first-stage diversion of the Grand River 12 miles north of Muskogee, Okla., where contractors are getting the new Fort Gibson Dam under way for the Tulsa District Office of the Corps of Engineers.

A joint-venture group, including Al Johnson Construction Co., Winston Brothers Co., and Peter Kiewit Sons' Co., is initiating the first contract. At \$13,500,000, it will do all but the powerhouse construction work in the big \$32,000,000 flood-control and hydroelectric project.

Rising far out in east-central Kansas, the Grand River twists and turns down through that state and Oklahoma, emptying into the Arkansas River about 4 miles from Muskogee. It drains a watershed of 12,660 square miles of which 12,615 are above the site of Fort Gibson Dam. Construction of Fort Gibson Dam as part of a three-dam system on the river will protect about 2,000 acres immediately below the big gravity-type concrete structure. In addition, it will help to control the Arkansas below Muskogee.

#### Steel Cofferdam Diverts River

Operations started on May 22, 1946. The left abutment was stripped and work began on the driving of a steel sheet pile cellular-type cofferdam to divert the river flow away from the initial stage of construction. (This flow varies from about 5,000 cfs to a maximum of 150,000 cfs.)

M-112-type Carnegie steel sheet piles in 40 and 50-foot lengths were used, about 103 pieces to each 45-foot-diameter cell. Some good pile-driving records were set. A barge-mounted American Revolver Model 25-R steam-powered crane was used to pick up and spot the circular steel template, to pick up and set the steel sheet piles, to hold the pile hammer, and finally to pull the template after the cells were driven.

The steel pile sections were set and barely started as an initial step. When the circular cell had been completed all the way around so as to interlock, driving was carried on to refusal. All piles were driven to a ledge of hard limestone and shale bedrock extending across the river valley. Working a 10-hour shift, pile crews managed to set records of one complete cell per shift.

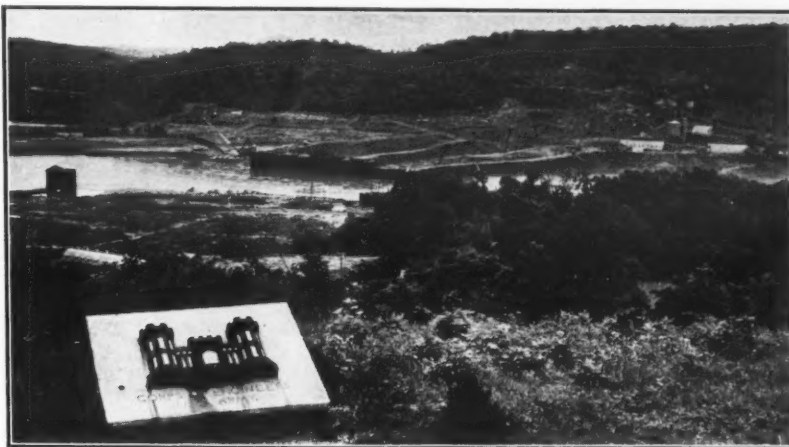
A 12-inch commercial sand dredge was used to pump the cells full of sand up to a point about 10 feet above the river level. The remainder of the cells was filled by a barge-mounted Lima machine carrying a 2½-cubic-yard clamshell. As long as it was feasible, end-dump Euclids were used also from the left abutment, filling the cells with material dug by a Northwest 80-D shovel.

## KEWANEE BOILERS

for heating  
and power

since 1868

KEWANEE BOILER CORPORATION  
Kewanee, Illinois



C. & E. M. Photo

Preliminary cofferdam work to divert the Grand River away from the initial stage of construction at Fort Gibson Dam is shown from the right abutment.

The overburden in the first area enclosed by the initial cofferdam was then cleaned up, with two 8-inch centrifugal sand pumps driven by Buda engines keeping the water pumped down. T-

connections were driven in the first cofferdam cells to permit the second-stage construction to hook on for unwatering purposes.

Bedrock conditions in the cofferdam

area now exposed are such that additional studies were undertaken by the Army Engineers. Several 36-inch calyx cores have been removed, but no changes in foundation design are indicated to date.

#### Construction Plans Made

The general construction of Fort Gibson Dam is expected to be done in three stages. The first stage will bring the east half, on the left abutment, well up from the river floor, leaving a few low monoliths. Second-stage construction will fill in the west or right half well above the water line while the river goes through the low monoliths on the first stage. Finally, the remaining construction will be brought on up in the third and last stage under this contract. There remains, of course, further contract work for the construction of the powerhouse.

#### Concrete Preparations Under Way

Preparations to start concrete placing (Continued on next page)

## LUBE MEMO

*Why it's smart to avoid "metal eating" lube oils*

*Heat and air in Diesels make many oils corrosive so they "eat" lead from structure of alloy bearings*

*pitting spoils bearing surface - leads to failure*

*Joe says bearings look like this after using RPM Delo Oil*

1. RPM Delo Diesel Engine Lubricating Oil contains anti-oxidant compound, resists effects of heat and air.
2. Gives bearings direct protection against corrosion.

*Note - arrange trial of RPM Delo Oil ... looks like it'll save us \$\$\$!*



STANDARD OIL COMPANY OF CALIFORNIA, Los Angeles, Calif.  
THE CALIFORNIA OIL COMPANY, New York

STANDARD OIL COMPANY OF TEXAS, Dallas, Texas  
THE CALIFORNIA OIL COMPANY, New York

## Dam Job Begun

(Continued from preceding page)

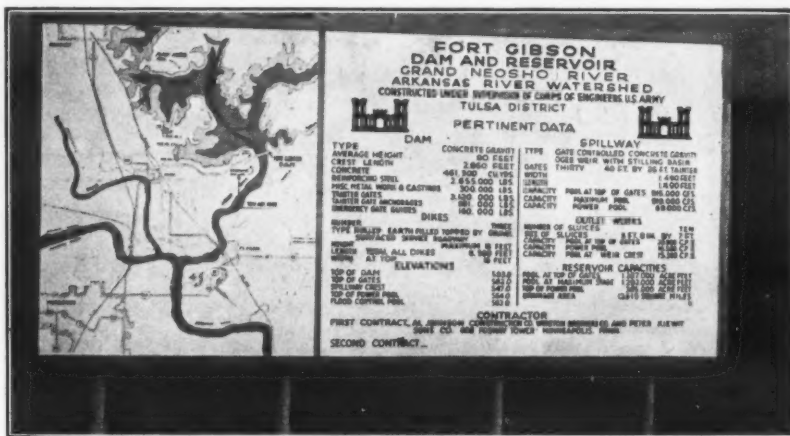
not later than August 1, 1947, were in full swing when the job was visited. Installing equipment which can manufacture, batch, mix, and place concrete at a rate of from 150 to 175 cubic yards an hour is a big job all by itself.

A refrigerating plant with a capacity of 200 tons of ice per day was installed. It will furnish ice to the concrete batches, and keep concrete temperatures under 80 degrees during hot sweltering summer days. A C. S. Johnson fully automatic batch plant was erected by a new Model 54-B Bucyrus-Erie crane. The plant has 16 pens on its automatic recorder, and will automatically weigh out eleven different aggregates.

The concrete is mixed immediately under the Johnson weigh hopper by four Koehring 2-yard mixers. It is dumped to 2 and 4-yard Blaw-Knox buckets, hauled by Euclids to the dam several hundred yards away, and picked up and poured by two gantry-mounted American Revolver cranes. It was expected that the big cranes would easily handle 4-cubic-yard dump buckets on a 140-foot boom. According to Chief Engineer Harlo Haagenon, the crane used for pile driving recently picked up a Caterpillar D8 bulldozer with a flat boom.

An unusual aspect of batch-plant erection was the installation of a 90-inch-diameter Armco corrugated-metal pipe 650 feet long, to serve as a tunnel under the great piles of concrete aggregates. This pipe was shipped in by railroad and assembled on the job. It houses the big conveyor, leading under the trapdoors beneath the rock piles. Over 500,000 cubic yards of concrete aggregates and sand will move through the trapdoors into the big tube, up the conveyor, and eventually to the dam.

A custom-built bulk-cement silo with a storage capacity of 7,500 barrels was erected. Also, 5 miles of spur track was rebuilt by contractor's men over a road-bed which the railroad abandoned several years ago. The St. Louis-San Francisco railroad serves the Fort Gibson side of the dam, with a Kansas, Oklahoma & Gulf Railroad siding on the right abutment in the town of Okay, Okla. The MK&T railroad also runs



C. & E. M. Photo

This Corps of Engineers guide sign gives visitors full details concerning the Fort Gibson Dam. The initial \$13,500,000 contract will do all but powerhouse construction work in the big \$32,000,000 flood-control and hydroelectric project.

through the general area.

Early plans to take sand from the Arkansas River were abandoned. A subcontract was let to M. O. Weaver of

Des Moines to quarry and manufacture from hard native limestone all aggregates and sand to go into the big dam. Construction of an access road from the

plant to this quarry was a big job in its own right, involving extensive drilling and shooting of stone.

There are certain to be some very interesting construction problems as concrete placing gets under way, and CONTRACTORS AND ENGINEERS MONTHLY will carry a thorough coverage of the various activities.

By no means is the placing of concrete the only big construction item. Under a separate contract by the Corps of Engineers, some 8,500 linear feet of rolled-earth-fill dikes, with a top width of 16 feet, will augment the dam itself to contain the big reservoir. More than 3,200,000 pounds of Taintor gates will be installed in a gigantic spillway capable of handling peak overflows of 919,000 cubic feet per second. These great gates, 30 of them, will be 40 x 35 feet in size and weigh 45 tons apiece. In addition, ten sluice gates 5 feet 8 inches x 7 feet in size, located deep down in the dam, will be able to release up to 20,800 cfs.

(Concluded on next page)

### America's Most Complete Line of Material Handling Buckets

**All purpose**

- SHOVEL
- PULLSHOVEL
- DRAGLINE
- CLAMSHELL

**Clamshell**  
Sizes 3/8, 1/2, 3/4, 1, 1 1/2, 2 yds.

• FRONTS, BOTTOMS, SCOOPS AND TEETH are 14% manganese steel developing tensile strength up to 120,000 p.s.i. This high percentage manganese steel gives tough, rugged strength for hard service and allows wide set corner teeth for easy entrance in digging. Volume production methods enable us to build a better bucket with amazing economies in manufacturing.

**On the 1/2 yd. and 3/4 yd. Shovel, Pullshovel and Dragline Buckets, all teeth are interchangeable—a great advantage to operators.**

**Shovel**  
Sizes 3/8 to 18 yds.

**Experience Counts**

See your shovel man or equipment dealer about PMCO Buckets and Dippers.

**Pullshovel**  
Outside Cutter Widths: 26"—31"—36"—39"

**Dragline**

All Purpose and Perforated  
Sizes 3/8 to 2 yds.  
Stripping sizes 2 to 9 yds.

**Shovel**  
Sizes 3/8 to 18 yds.

"Quality Since 1880"

## PETTIBONE MULLIKEN CORP.

WE OPERATE THE LARGEST AND MOST COMPLETE MANGANESE STEEL FOUNDRY IN THE UNITED STATES.

CHICAGO 51, U. S. A.

### CONTRACTORS RUBBER PRODUCTS

available from Stock for immediate Delivery.

CONVEYOR, ELEVATOR and TRANSMISSION BELTING all widths and piles

V-BELTS all sizes

#### HOSE

all sizes and types

AIR	DISCHARGE	STEAM
FUEL	COMPRESSOR	VACUUM
FIRE	PILE DRIVERS	SUCTION
WATER	ROAD BUILDERS	WELDING

BOOTS, DREDGE SLEEVES, PUMP DIAPHRAGMS, ETC.

... and everything rubber for Industrial Requirements

Write for new catalog

PHONE ..... WRITE ..... WIRE

**CARLYLE RUBBER CO., Inc.**

62-66 PARK PLACE NEW YORK 7, N. Y.  
Phone: BA 1104, 7-1723



## Dam Job Begun

(Continued from preceding page)

When completed, Fort Gibson Dam will have a crest length of 2,850 feet and will rise about 90 feet above the present river level. With the reservoir at maximum stage, about 1,287,000 acre-feet of storage will be provided. Even at the top of the power pool, some 365,000 acre-feet will be impounded.

Extensive recreation facilities are being planned. A 48-inch water-supply outlet for the city of Muskogee will be installed. And it is expected that about 73,800 kilowatts of installed generator capacity will be provided for.

### Personnel

All field work is being done under the direction of Oscar McCormick, Vice President of the Al Johnson Co., acting as General Manager of the job. O. A. "Big Al" Johnson is Superintendent of the project, and Harlo Haagenon is Chief Engineer. Frank Newell is the Resident Engineer representing the Government on the job.

The general contract, with the design of the dam, is under the direction of Col. Claude H. Chorpeneing, USA, District Engineer for the Tulsa District; Lt. Col. L. E. Funchess, Executive Officer; and Robert W. Noble as Executive Assistant.

### Safety-Goggle Design Keeps Lens Fog-Free

A rubber-frame safety goggle for work in hot and humid atmospheres is announced by the American Optical Co., Southbridge, Mass. The goggle is recommended by the manufacturer for use on jobs where dust or chemical hazards exist.

Feature of the Model 705 Super-Vent goggle is the nosepiece with an inhalation and exhalation valve to prevent fogging and steaming of the lens. When the wearer inhales, air is said to sweep through the chamber, removing moisture on the inner lens surface before it can fog. When the wearer exhales, the inlet valve closes, allowing moist air to escape through the exhalation valve.

The frame of the goggle is molded from natural rubber, and conforms to the contours of the face to give an airtight fit. The goggle has a large-size acetate single lens which is replaceable.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 4.

### Steam-Cleaner Units

A line of steam cleaners with no moving parts is made by the Ewing Mfg. Co., 2545 N. W. 10th, P. O. Box 875, Oklahoma City, Okla. Natural-gas burners are standard equipment. Butane and propane burners are available. It comes in one portable and six stationary models.

Conversion rate from water to steam varies from 1 to 4 gpm. Water pressures required range from 40 to 125 pounds. A special pressure pump that is standard on models listing pumps is made in 1/2, 3/4, and 1-hp sizes. It is required where water pressure is below 60 pounds or where 90 pounds or more is needed for the larger models. The soap container furnished with all models has a 35-gallon capacity.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 3.

### Expansion Bolts, Anchors

A line of expansion bolts, anchors, and other accessories for widening and repairing concrete highways is described in Catalog 42 issued by the American Expansion Bolt & Mfg. Co.,

903 No. Spaulding Ave., Chicago, Ill. Also included are hook inserts, J-bolts, tie bars, slip rods, etc.

This 24-page catalog shows construction details of the various pieces in the line, and sizes and styles in which they are made. Drawings are used to indicate spacing and other details of design for installation. Photographs show the bolts being placed, and jobs on which they have been used.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 68.

### Galion Ups Sales Heads

Three men in its Sales Department have been given promotions by The Galion Iron Works & Mfg. Co., Galion, Ohio. C. F. Boyd was elected Vice President in charge of sales; George D. Finney was appointed Sales Manager in charge of the southern and western divisions; and Robert C. Monnett was appointed Sales Manager in charge of the eastern and central divisions.

## FOR ROADSIDE DEVELOPMENT ALWAYS SPECIFY

# Scotts GRASS SEED

Late summer and fall is the best time to seed any new grading . . . and sowing Scotts Seed is your best bet to secure the thick turf needed to eliminate erosion. There is no substitute for Scott quality, as proven by the thousands of fine lawns from coast to coast. Write today for our seeding recommendations and prices on your next project. We will send along a complimentary volume of Lawn Care bulletins, no obligation of course.

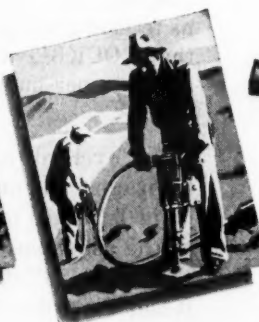
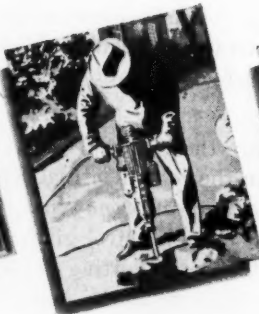
O M Scott & SONS CO., 17 Park Ave., Marysville, Ohio



## THOUSANDS OF JOBS ARE MOVING FASTER

All over the nation—on every kind of job, big or small—Barco Portable Gasoline Hammers are speeding up the work. And because these busy self-contained workhorses have proved so efficient, more and more bosses are calling for Barco. They like the way it works in rugged or hard-to-reach spots, and the strength it gives a man, big or small. Barco is available with eleven special tool attachments, adaptable to dozens of different jobs. Write for complete information.

BREAKING • DRILLING • DRIVING • TAMPING



# BARCO

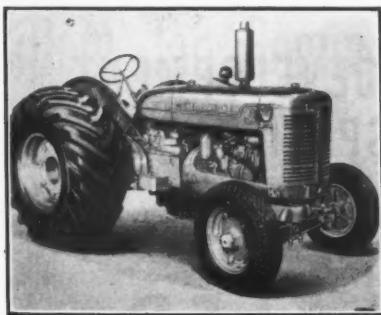
## PORTABLE GASOLINE HAMMERS

FREE ENTERPRISE—THE CORNERSTONE OF AMERICAN PROSPERITY

BARCO MANUFACTURING COMPANY, NOT INC.

1818 WINNEMAC AVENUE, CHICAGO 40, ILLINOIS

In Canada: The Holden Co., Ltd., Montreal, Canada



Here is the new single rear wheel and tire International Harvester has developed for its I-9 and ID-9 wheel tractors. It was designed to eliminate the ridge left by dual wheels in off-the-highway operations.

### Single Rear Wheels For Use on Tractors

Development of 18.00 x 26 single rear wheels and tires for use on its Models I-9 and ID-9 wheel tractors has been announced by the Industrial Power Division of the International Harvester Co., 180 No. Michigan Ave., Chicago 1, Ill.

In off-the-highway operations, the company points out, the ridge left by dual wheels tends to make it hard for single-tired equipment following in the track to stay in line. With the new tire, it is claimed, this tendency is successfully overcome.

The new tires are 18.00 x 26 and give the same tread as the former dual tires. They permit drawbar pulls from 5,500 to 7,500 pounds, depending upon ground conditions and the amount of weight on the drive wheels.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 100.

### New Battery Charger Delivers 100 Amperes

Equipment for fast charging of storage batteries is the specialty of Quick Charge, Inc., 1750 N. E. 10th St., Oklahoma City 4, Okla. The Quick Charge units are made to deliver 100 amps. This current can also be used to slow-charge up to twenty batteries hooked in parallel, each one receiving a proportionate amount of the current.

There are four basic models: Q-300, Q-400, Q-175, and Q-50 (50-amp output). Machines may be purchased to operate on any desired frequency above 25 cycles. Voltage standard is 115 volts, but other voltages are available upon request. These units can be used to charge Edison cells.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 45.

### ASCE Summer Convention

Waterways, highways, construction, power, and other subjects affecting the middle west were discussed at the summer convention of the American Society of Civil Engineers. The meeting was held in Duluth, Minn., July 16-18.

Approximately 500 experts in these and other fields of civil engineering were in attendance. In addition to the ten technical division sessions and the general sessions, special social functions and excursions were arranged for the members and their wives.

### Shaw Sales Adds Dealers

Seven additional dealers for its Wheeler tandem rollers have been named by the Shaw Sales & Service Co. of Los Angeles: Construction Equipment & Supply Co., Gainesville, Fla.; Hutchinson Foundry & Steel Co., Hutchinson, Kans.; Tractors Incorporated of Providence, R. I., and Newton Highlands, Mass.; Ruffridge-Johnson Equipment Co., Minneapolis, Minn.; Interstate Equipment Co., Statesville, N. C.; Carr Equipment Co., Columbus,

Ohio; and Conte Equipment Corp., Pittsburgh, Pa.

### Wire-Rope Lubricant

A wire-rope lubricant is made by the Brooks Oil Co., 315 E. Carson St., Pittsburgh 19, Pa. Klingfast lubricant features the Indestructible pH-ilm which is characteristic of Brooks Leadolene lubricants. It is furnished in 25 and 50-pound pails, 100-pound kegs, and 50 to 55-gallon drums. It may be sprayed, brushed, or troweled on.

Among the properties claimed for Klingfast are: resistance to abrasion and corrosion; a high affinity for steel and other metals; a high resistance to water, lubricating oils and greases, scale, dusts and other forms of contamination; and resistance to deterioration or malfunction caused by temperature extremes. It is available in several colors.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 43.



Repairing Concrete Bridge Deck

## Pressure Vibration POWER TROWEL Bonds Concrete

Permanently bond new concrete—restore disintegrated concrete—with combination of pressure and horizontal vibration supplied by Power Trowel. Modern tool. Air turbine motor. 10,000 vibrations per minute. Hand operated. Snap-on handles. Quick—lasting—low cost jobs. Write for facts—send us your vibration problems.

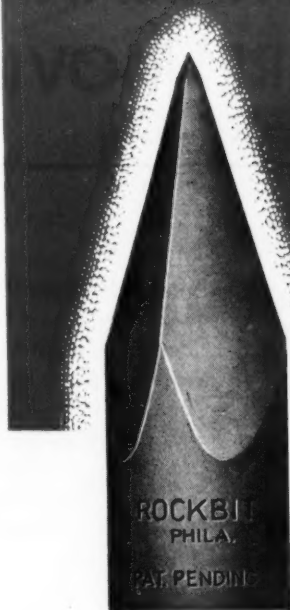
THE  
**INTERNATIONAL  
VIBRATION CO.**

16700 Waterloo Rd., CLEVELAND 10, OHIO

New 12'-0" Macadam Vibrator now ready for macadam road and airport construction.

## CUT YOUR CONCRETE BREAKINGTIME IN 1/2

## WITH "ROCKBIT" DETACHABLE MOIL POINTS!



• ROCKBIT detachable point before using.



• Same point after breaking 32 sq. yds. of 14" concrete.

This remarkable record of 32 square yards' breakage with one regrind was made on a street project. The job called for breaking up 14-inch concrete and was one of a series of projects chosen as testing grounds for the sensational new ROCKBIT detachable point. Other tests have proved that ROCKBIT detachable points will stay sharp longer by more than 7 to 1 and break 50% more concrete per man hour. *No other point can match this record.*

Such records are the result of long research in the laboratory and on-the-job. The ROCKBIT detachable point is forged of two different types of steel instead of the usual one. "Tough" steel gives long life to the shank. "Hard" steel gives cutting ability to the point. When the point dulls it can be detached and a new point placed on the same shank, eliminating the need of many tools. The old point can be reground by any laborer. Old-fashioned blacksmith resharpening is eliminated.

Prove for yourself that ROCKBIT detachable points will cut your time and costs. If your distributor cannot supply you, write direct to our nearest plant.



**DEALERS ATTENTION:** Immediate delivery from stock on all "ROCKBIT" Pneumatic Accessory Tools. Write for complete catalog and price list.

**ROCKBIT**  
SALES AND SERVICE CO.

**ROCKBIT SALES & SERVICE CO.**

2514 E. Cumberland St.,

Philadelphia 25, Pa.





C. &amp; E. M. Photo

This short length of experimental batter caisson shows a section of steel H-beam core in the shell. If the caisson were to be used in a foundation the core would be inserted in the shell and rock socket, and embedded in concrete.

## Deep Caisson Driven On Batter to Bedrock

Experimental Caisson With 30-Inch Diameter Is Open for Inspection: Developed for Use in Bridge and Similar Foundations

♦ AT the Long Island City, N. Y., yard of the Drilled-In Caisson Corp., an experimental 70-foot caisson has been driven to rock on a batter of 1 to 8. Heretofore this type of deep caisson has only been driven plumb; in this position it will support vertical loads up to 2,000 tons, depending on the size of shell, type of steel core, and depth of socket into the rock. The batter caisson can be utilized, however, in foundations resisting a horizontal thrust, as in bridge substructures; it can resist horizontal loads up to 250 tons. These batter caissons may also be driven on a batter of 1 to 6.

The experimental caisson consists of a single length of Armco cold-rolled spiral-welded steel cylinder shell, ½ inch thick, which has a 30-inch outside diameter and weighs 5½ tons. It was driven during January, and since then has been open for inspection by engineers, architects, technical students, contractors, and others.

### Driving the Caisson

At the lower end of the shell is a specially tempered tool-steel cutting shoe. It is connected to the shell by circumferential and plug welds. This shoe guards the pipe from damage when driving through obstructions, and provides a protection for seating the shell in bedrock. Driving was done by a Vulcan No. 0 steam hammer moving in 90-foot steel leads which were tilted to the desired batter.

The upper 15 feet in the yard was fill material that had been deposited all along this strip of Queens bordering the East River. Below that came successive

strata of sand, gravel, and boulders, until rock was encountered 58½ feet below the surface of the ground. The top of this rock was a disintegrated mica schist, but the cylinder was driven 4 more feet to solid rock known as Manhattan schist. Ground water filled the cylinder during the driving. The hard layers were broken up by a drill and excavated with a bailing bucket.

A socket in bedrock was drilled 6 feet 2 inches below the level of the cutting edge with a specially designed bit. This bit is 8 feet 6 inches long, weighs 3,800 pounds, and has six vanes which are 6 feet long. The rock cuttings were removed by bailing. If this caisson were to be used in a foundation, a steel core would be inserted in the shell and rock socket and embedded in concrete. The caisson would be locked in the rock at the bottom, and locked into the structure on top, resulting in a fixed-end column on an incline.

### Open for Inspection

Since the caisson was drilled only for



C. &amp; E. M. Photo

This special core bit was used for drilling the batter caisson. It is 8½ feet long, weighs 3,800 pounds, and has six vanes 6 feet long.

experimental work, the H-beam core has been omitted and also the concrete. Ground water is bailed out so that visitors may inspect the interior of the caisson. A cage made of reinforcing bars

welded together is lowered into the caisson by a cable from the Bucyrus-Erie 29W drill rig which also handles the drill and bailing bucket. The cage holds one person at a time. Conversations in ordinary tones are easily carried on in the 70-foot caisson between the operator on top and the person in the hole, since the pipe amplifies the sound.

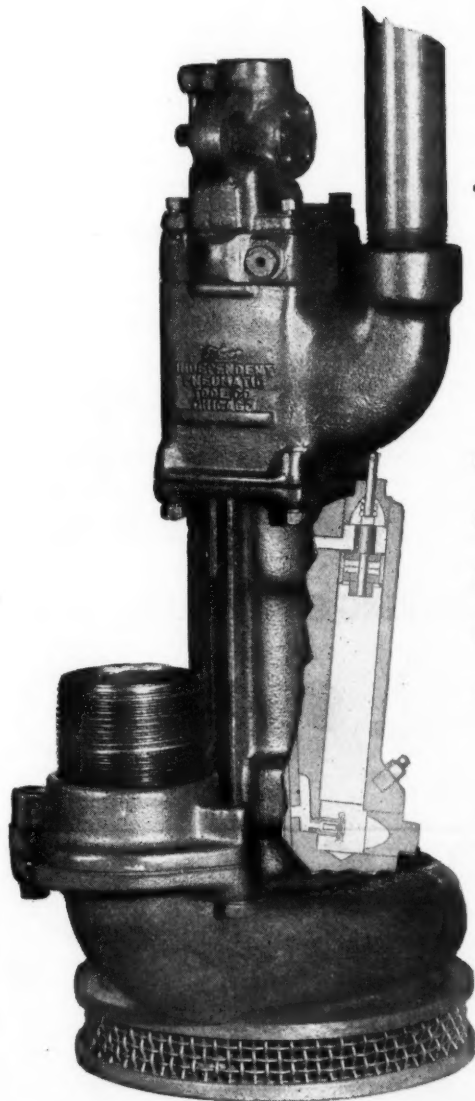
### Film on Modern Parkways

The advantages of modern parkways is the subject of a documentary sound-color motion picture now being filmed under the direction of the New Jersey State Highway Department. Titled "Parkways of Progress," its purpose is to show the benefits to be derived from a modern system of parkways and free-ways.

The picture is being produced by The Princeton Film Center of Princeton, N. J., and will be made available to organizations interested in showing it. Running time will be about 20 minutes.

# Thor SUMP PUMPS

## Keep Pumping!



### ... Improved Lubrication Assures Peak Efficiency

In Sump Pumps, the *impeller shaft bearings* are the most vulnerable parts, with premature failure causing undue job delay and expense. Thor safeguards these vital points by a large grease reserve that is force-fed under continuous air pressure—pressure that further prevents foreign matter from working into the bearings. Because of this *exclusive feature*, Thor Pumps can be operated continuously up to a full shift without regreasing.

Thor Sump Pumps are designed to operate efficiently in clean or dirty water; in oil, sludge or sewage—either partially or fully submerged. Your nearby Thor Distributor will gladly demonstrate them as the economical answers to your sump-water problems.

### INDEPENDENT PNEUMATIC TOOL COMPANY

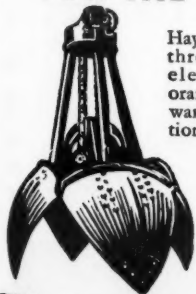
600 W. Jackson Blvd., Chicago 6, Illinois

Birmingham	Boston	Buffalo	Cincinnati	Cleveland	Denver	Detroit
Houston	Los Angeles	Milwaukee	New York	Philadelphia	Pittsburgh	
St. Louis	St. Paul	Salt Lake City	San Francisco	Toronto, Canada	London, England	

# Thor PORTABLE POWER TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

### USE RIGHT BUCKET FOR THE JOB

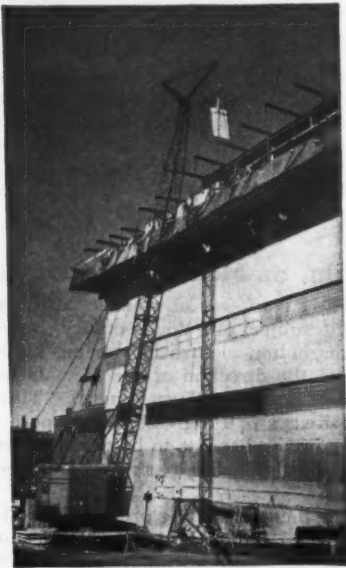


Hayward makes all three—clamshell, electric motor, orange peel. A Hayward recommendation is unbiased.



THE HAYWARD CO., 32-36 Dey St., New York

## Hayward Buckets



A new P&H Model 455A crawler crane, with an 80-foot boom and a 15-foot jib, placed the structural steel members in an industrial building in Milwaukee. Then, with a 75-foot boom and 15-foot jib, it placed the stone trim. Later, the boom was reduced to 45 feet and a clamshell bucket was used for clean-up. Walter A. Woods Crane Service owns the Model 455A.

### Brake-Band Linings And Clutch Facings

Seven new clutch-facing and brake-lining assemblies for use with Caterpillar equipment have been announced by The S. K. Wellman Co., 1374 E. 51st St., Cleveland, Ohio. Included are steering-clutch packs for D2, D4, D6, D7, and D8 tractors, clutch disks and brake-band linings for No. 24 and No. 25 cable controls, and master clutch plates for No. 11 and No. 12 motor graders.

Feature of the Velvetouch line is an all-metal design said to eliminate oil rot, minimize repair and adjustment, and extend service life.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 9.

### Engine-Gum Solvent

A liquid solvent for removing gum accumulations in fuel lines and in carburetor jets and passages is made by the Pennsylvania Refining Co., 2686 Lisbon Road, Cleveland 4, Ohio. Penn-Drake Gumout is also recommended by the manufacturer for use with sticking jackhammers.

Gumout is applied directly into the carburetor float chamber for badly gummed equipment. After that, it is claimed, engines can be kept clean of gum by regular application of Gumout into the gasoline tank. Penn-Drake Gumout can also be used, its manufacturer says, to loosen sticky valves and rings by direct application in the compression chambers.

Further information and a sample may be secured from the company, or by using the enclosed Request Card. Circle No. 37.

### Data on Small Dirt-Mover

Broadsides illustrating and describing the Model D Tournapull are now available from R. G. LeTourneau, Inc., Peoria 8, Ill. The large folder TP-136, which opens to 23 x 33 inches, explains in detail design features claimed for this new unit. Large-size on-the-job photographs show how it can be used on small-yardage projects.

Two other small folders on this same piece of equipment are also distributed by LeTourneau. Form No. TP-138 announces its availability, and Form No. TP-134 describes in detail its application, capacities, and other data.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 94.

### Report Made by Committee On Highway Organization

A report of the Committee on Highway Organization and Administration has been published in booklet form by the National Research Council, Washington 25, D. C. Presented at the 26th Annual Meeting of the Highway Research Board, it is available as Bulletin No. 3.

The report includes a paper on the various types of state highway administrative organizations, by W. L. Haas, Chief, Administrative Research Section, Division of Financial and Administrative Research, Public Roads Administration; one by C. M. Nelson, Editor, *Better Roads*, on research in county and local road administration; and a summary of the functions, program, and progress of the Committee.

Copies are available by writing directly to the Highway Research Board of the National Research Council. Price 30 cents per copy, postpaid.

### Directions for Blending Admixture with Bitumens

Directions for blending Nostrip with bituminous materials have been written up in booklet form by the Nostrip Division of Maguire Industries, Inc., 122 E. 42nd St., New York 17, N. Y. Nostrip is an additive for bituminous mixes to make possible the use of wet aggregate. Instructions are given for blending Nostrip in a stationary tank, in a distributor or tank transport, and in a tank car.

Drawings and text explain the various methods. Directions are also given for cold-patch work in the field. A table shows the amounts of Nostrip to be added to tar or asphalt to give the desired ratio of 1 or 1½ per cent.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 55.

### Portable Generators For Acetylene Welding

A catalog describing its line of acetylene generators is available from The Sight Feed Generator Co., No. 10th and Main Sts., Richmond, Ind. The catalog describes their construction and operating principle. It also lists what the manufacturer feels are the safety and money-saving advantages of using the acetylene generator.

The various models of generators are described, as well as all accessories made for them. Specifications, weights, and photographs are included to give a complete description of the line.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 51.

### Link-Belt Promotions

Harold L. Hoefman has been elected Vice President in charge of manufacturing by the Link-Belt Co., Chicago, Ill. His former position as General Manager of the Pershing Road plant will be filled by David E. Davidson.

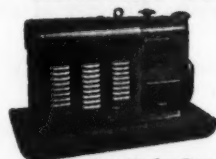


To offer owners year-round utility Minneapolis-Moline has designed the model RTI and UTI tractors to accommodate a wide variety of attachments . . . Dozers, snow plows, material buckets, lifting forks, winches, and many other tools make MM industrial tractors the hardest workers on any construction job . . . New extra heavy duty front wheel and axle construction now provides increased strength for lifting larger pay loads.

See Your Nearest M-M Dealer, Distributor or Write

**MINNEAPOLIS-MOLINE**  
POWER IMPLEMENT COMPANY  
MINNEAPOLIS 1, MINNESOTA

### MASTER COST-SAVING EQUIPMENT—FOR IMMEDIATE DELIVERY



Portable Gas-Electric Generator Plants, Sizes 500 to 17000 Watts (Catalog No. 815-A)



General Purpose Floodlights



Gas or Electric Concrete Vibrators (Catalog No. 689)



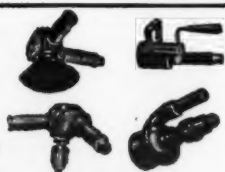
Gas or Electric Grinding Machines and Power Tools (Catalog No. 683)



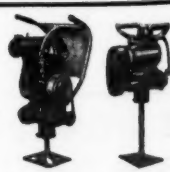
BIG-3 for Generation, Tool Operation and Concrete Vibration (Catalog No. 687)



Hand Tools for all Master Vibrators, BIG-3, and Grinding Machines (Catalog No. 683)



"Power-Blow" Electric Hammer and Spade (Catalog No. 688)



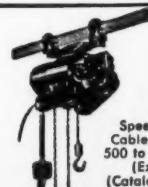
Gas or Electric Tampers (Catalog No. 699)



Vibratory Concrete Finishing Screed, Sizes 6' to 36' (Catalog No. 596)



"Turn-A-Trowel" for trowelling concrete Sizes 48" or 34" (Catalog No. 695)



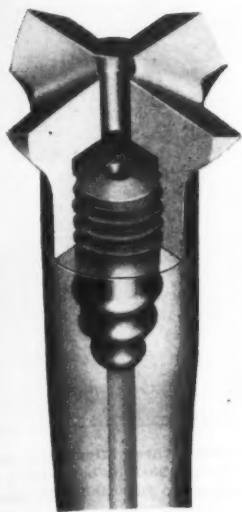
Speedmaster and Cablemaster Hoists 500 to 6000 lbs. cap. (Export only) (Catalog No. 705-A)



Send for illustrated catalog on any item to

**MASTER VIBRATOR COMPANY**  
DAYTON 1, OHIO





This stud-type Jackbit has wing curves that enable it to retain the proportions of a new bit through many resharpenings, says its maker.

### Stud-Type Drill Bit

A new stud-type Jackbit has been added to the line of rock-drilling equipment made by Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y. According to the company, newly designed wing curves enable the bit to retain its original proportions through many resharpenings.

The resulting small gage loss permits using successive bits with reductions in diameter of 1/16 inch or less per change. This makes it possible, the manufacturer points out, to start holes with smaller bits than previously used and still bottom them at the same size as before.

The projecting end of the Jackstud, which connects the bit to the drill steel, has reversed buttress-type threads for attachment of the bit. The threads are case-hardened. There is said to be no undercut into which the bit skirts can upset and become locked.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 38.

### Foot-Operated Vises

Two new vises with jaw-pressure capacities up to 5 tons and 7½ tons are made by the Studebaker Machine Co., 1221 So. 9th Ave., Maywood, Ill. They are self-contained units requiring no outside power source; the operator builds up pressure by touching a hydraulic pump with his foot. The use of built-in gibs set at 45 degrees in V-ways is said to maintain accurate and positive gripping pressure.

The Model No. 750 Torpedo has a maximum opening between jaws of 7½ inches, a 4½-inch jaw depth, a 5¼-inch jaw width, and a maximum 7½-ton jaw pressure. The Model No. 500 Bullet has a 5-inch jaw opening, a 3-inch jaw depth, a 4¼-inch jaw width, and a 5-ton maximum jaw pressure.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 23.

### Clyde Changes in Midwest

The appointment of Leonard A. Hendrickson as its midwest regional representative has been announced by the Clyde Iron Works, Inc., Duluth, Minn. He will make his headquarters at 612 No. Michigan Ave., Chicago.

John Van Zandt, who has been District Sales Manager in the midwest area for the past two years, has been transferred to the home office at Duluth.

### Porter-Cable Promotions

Douglas M. Lyon is the new Sales Manager for the Porter-Cable Machine Co. of Syracuse, N. Y. He succeeds H. L. Ramsay, who has been made Vice President in Charge of Merchandising.

### Covers of Tarpaulin

A line of tarpaulins is made by Canvas Products Co., 651 W. Fulton St., Chicago 6, Ill. Never Rip tarpaulins and canvas covers are designed for covering equipment, materials, work, or workmen whenever protection from the elements is essential.

They are said to be waterproof and flameproof. Seams are double-stitched, edges are hemmed all around, corners are reinforced, and the brass grommets have double reinforcing.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 25.

### Concrete-Vibration Data

A 32-page catalog containing new and up-to-date information on concrete vibration and new Wyco vibrator machines has recently been issued by Wyzenbeek & Staff, Inc., 838 W. Hubbard St., Chicago 22, Ill. The Wyco line includes concrete vibrators, contractors'

grinders, and flexible-shaft machinery and equipment. Among the company's new vibrator machines are jackshaft double-V-belt-drive units.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 59.

### Cement-Firm President

William D. Spears was recently elected President of the Cumberland Portland Cement Co. of Chattanooga, Tenn. He succeeds Frank Pearson, who has retired after 21 years' service.

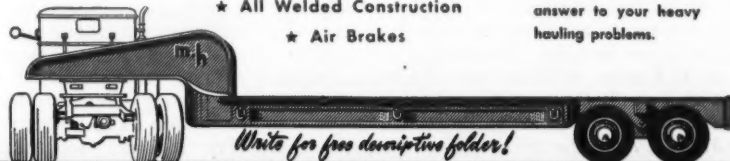
## RUGGED STRENGTH FOR HEAVY HAULING

★ 25 Ton Capacity

★ Tandem oscillating axles

★ All Welded Construction

★ Air Brakes



Write for free descriptive folder!

MILLER-HASSELBALCH & CO., INC.

215 NORTH 12TH STREET  
OMAHA 2, NEBRASKA

### The m-h "25" Semi

With electric welding throughout... sturdy steel construction... and careful attention to weight distribution, the M-H "25" is the ready answer to your heavy hauling problems.

## UNITED STATES RUBBER COMPANY

SERVING THROUGH SCIENCE



# HYDRON

Hydron is the modern, flexible type of concrete form-lining which case-hardens and beautifies concrete surfaces.

Concrete placed against Hydron loses water during and after vibration. Air voids, sand streaks are eliminated from the surfaces. This means a dense, hard, smoother concrete surface, with greater resistance to weathering and abrasion.

Mounted to forms with rapid-fire staple guns, these light, flexible Hydron sheets produce a case-hardening effect at least one inch deep, with a gradual change in the water-to-cement ratio from the surface into the bulk concrete.

Hydron has been used on many of the largest private and governmental construction jobs in the country, including giant dams and flood walls. Available only through U. S. Rubber Company branch offices.

Send for interesting copy of informative booklet on Hydron. United States Rubber Company, Mechanical Goods Division, 1230 Avenue of the Americas, New York 20.



**NOW!**

MORE DURABLE.  
SMOOTHER  
CONCRETE...

Note the smooth appearance of this concrete wall, cast against Hydron. There are no disfigurements, no surface imperfections. Both structural strength and surface abrasion-resistance are greatly increased by using Hydron.



## U. S. ENGINEERED RUBBER PRODUCTS FOR THE CONTRACTOR

Air, Water, Steam, Suction Hose • Belts • Packings • Tape

# Gravel Road Paved With Hot Plant-Mix

## Tractor-Drawn Wagons and Scrapers Handle Grading; Sand-Clay Base Laid Full Width of Roadway

THE Alabama State Highway Department is reconstructing 31 miles of a 15-year-old gravel road. It lies between Grove Hill and Monroeville in Clarke and Monroe Counties, in the southern part of the state.

The project on State Route 44 is divided into two sections. The east portion of 12.4 miles is under contract to the Vandergriff Construction Co. of Montgomery, Ala., at a bid price of \$320,572.70. And the west stretch of 18.7 miles, the subject of this article, is under contract to the McKee Construction Co. of Jackson, Ala., at a bid price of \$493,434.01. Work on the latter contract began in September, 1946, and will require a year to complete.

The original alignment of the old 26-28-foot gravel roadway, shoulders included, is generally followed except in three locations; there revisions from 1 to 2 miles long eliminate sharp curves. Grading operations with tractor-drawn wagons and scrapers have widened the roadway to 34 feet. This includes a 22-foot pavement and 6-foot shoulders.

Wherever unsuitable material was encountered in the subgrade, it was removed and replaced with roadbed topping, a mixture of sand and clay, from 6 to 12 inches thick. A sand-clay base course, 8 inches thick, is laid the full width of the roadway. This base is given a bituminous prime coat; that is followed by a single bituminous surface treatment, and then a bituminous plant-mix wearing course for the finished pavement.

### Grading Operations

Short hauls in the common road-way excavation averaged 500 feet and seldom exceeded 750 feet. For these the contractor used two Heil and two Le-Tourneau scrapers, all of 8 to 9-yard capacity and pulled by International TD-18 tractors. For the longer hauls up to 1,500 feet, four Mississippi Model 75-S wagons were used, pulled by International M-R-S Special rubber-tired tractors.

The wagons were designed to carry a 9-yard struck load, but 12-inch wooden side boards were added, increasing their capacity to 12 yards. It was not uncommon to heap-load these units so that they carried from 16 to 18 cubic yards. The scrapers loaded themselves, while the wagons were loaded by a Northwest dragline with a 35-foot boom and a Hendrix  $\frac{3}{4}$ -yard bucket, or by a  $\frac{3}{4}$  or 2-yard Northwest shovel.

The common excavation was balanced in the cuts and fills, but the roadbed topping material and the sand-clay base course were obtained from ten different borrow pits located not more than  $\frac{1}{4}$  mile off the road. This material was shovel-excavated and moved in the Mississippi wagons an average haul distance of 2 miles. Top speed for the big

wagons was about 30 mph. They were equipped with sirens as a safety measure, since ordinary horns for either warnings or signaling were not loud enough always to be heard above the din of the surrounding construction machinery.

Material for the sand-clay base was bottom-dumped by the wagons over the roadbed and spread by a couple of Caterpillar No. 12 motor graders. To achieve the required 8-inch thickness, the material was put down in two courses of 6-inch loose measurement, and each course was compacted to 4 inches. The 100 per cent compaction was obtained by first thoroughly mixing the sand-clay together so that no pockets of either material were discernible and until the soil was of uni-



C. & E. M. Photo

After lunch hour on a road-reconstruction job in Alabama, three Mississippi wagons line up in a cut for loading by a Northwest dragline with a 35-foot boom and a Hendrix  $\frac{3}{4}$ -yard bucket. Sideboards were added to the wagons to increase their capacity.

form color; this was followed by successive rolling. Mixing and pulverizing was done with two disk harrows, a Rome 16-blade harrow with 24-inch-diameter disks, and an International

16-blade unit with disks 18 inches in diameter. Each was pulled by an International TD-18 tractor.

When the sand-clay was taken from (Continued on next page)



CONTRACTORS who use C.I.T. funds to buy construction equipment find that they can readily acquire all the machinery they need without tying up their working funds. As a result, they handle more work per day, earn larger profits and, at the same time, conserve their funds for payrolls, taxes, supplies and other operating needs. For example:

A contractor was running behind schedule on a road building job due to the frequent breakdown of obsolete equipment. New equipment was needed quickly and the profits to be earned by completing his contract on time fully justified the purchase. However, to pay all-cash would impair his working funds and additional capital was needed to complete the purchase.

C.I.T. agreed to advance 75% of the purchase price with repayments spread over two years. The new equipment immediately started to pay for itself; lost time was made up and, instead of a probable loss, the job was completed on schedule at a profit. The contractor acquired income-producing equipment that assured continued profits, plus improved facilities for handling future work.

This typical case illustrates how construction equipment can be bought with only a moderate initial investment. Reasonable costs and liberal terms commend the use of C.I.T. financing to concerns with limited as well as large resources. Find out how well C.I.T. can serve your financing needs. Any of these offices will furnish rates, terms and full information.

Send for NEW booklet which tells how we finance construction equipment

*The mark of leadership*

## C. I. T. CORPORATION

### Industrial and Equipment Financing

One Park Avenue  
NEW YORK

One N. La Salle St.  
CHICAGO

66 Luckie Street, N. W.  
ATLANTA

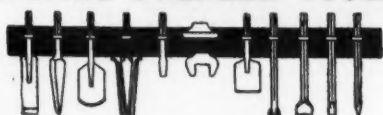
660 Market St.  
SAN FRANCISCO

416 W. 8th Street  
LOS ANGELES

AFFILIATED WITH COMMERCIAL INVESTMENT TRUST INCORPORATED

"BICKNELL BETTER BUILT"

## PAVING BREAKER TOOLS



We manufacture a complete line of tools for pneumatic paving breakers, rock drills and diggers.

Write for descriptive circular

**BICKNELL MANUFACTURING CO.**  
12 LIME STREET ROCKLAND, MAINE



## Gravel Road Paved With Hot Plant-Mix

(Continued from preceding page)

the borrow pits it was usually wet enough so that no water had to be added to reach the optimum-moisture content. However, if it remained spread out on the road for any length of time before being worked, water sometimes had to be added. Four Dodge trucks with 1,200-gallon tanks and 10-foot spray bars were available to sprinkle the base with water pumped from nearby creeks by Jaeger 4-inch centrifugal pumps.

Initial compaction was obtained by two sheepfoot rollers, a Ferguson and a LaPlant-Choate, pulled respectively by International ID-9 and TD-18 tractors. After these came a Grace pneumatic-tire roller pulled by an ID-9 tractor which imparted a smooth surface to each course of base material. When the bottom course was finished, the material for the top course was then spread out by the graders.

Before any rolling or mixing began, however, the bottom course was scarified to a depth of an inch by letting down the teeth on the back of the graders; this was done in order to make a bond between the two layers. The upper layer was then compacted in the same manner as was the lower. Further smooth-tire rolling was done with a Trailmobile 24-tire heavy-duty transport trailer which was loaded with a tractor to give it extra weight. An ID-9 rubber-tired tractor towed the machine around.

The 22-foot center portion of the roadbed was shaped to a crown of  $\frac{1}{4}$  inch to the foot, and the 6-foot shoulders have a slope of  $\frac{1}{2}$  inch to the foot. The front slopes vary in slope gradient from  $1\frac{1}{2}$  to 1, to 10 to 1, according to the height of the fills. The backslopes in cuts also vary from 1 on 1, to 8 to 1. Ditches are a minimum of 3 feet wide and are transitioned to a greater width as more water is accumulated. They are usually 3 feet near the crest of grade, and widen towards the beginning and end of the cuts to as much as 10 feet.

Because of the steel shortage, the seven bridges on the highway were not disturbed although they are only 20 feet wide. They will be reconstructed at some future time when the necessary materials for this construction are available.

### Bituminous Wearing Course

Traffic was maintained on the highway during all the construction operations, including the bituminous work that followed the completion of grading. This bituminous part of the contract was done by the Finley Construction Co. of Atlanta, Ga.

A prime coat of RT-2 tar, obtained from Koppers in Birmingham, Ala., was applied 23 feet wide at the rate of 0.27 gallon to the square yard by an Etnyre 1,000-gallon distributor mounted on a Mack truck. The extra 6 inches on each side beyond the pavement width was to prevent raveling. After a two-week curing period, a single surface treatment 22 feet wide was laid over the prime coat.

This consisted of a full-width application of AC-15 asphalt at the rate of 0.37 gallon to the square yard. The asphalt was procured from the Standard Oil Co. of Louisiana plant at Baton Rouge, La. All bitumen was shipped in tank cars to a siding of the Southern Railroad at Whatley, a town on the highway under construction and about 6 miles distant from the west end of the project.

The asphalt was covered at once by slag distributed through spreader boxes, 7 feet wide, at the rate of 35 pounds to the square yard. Slag was purchased

from the Birmingham Slag Co., at Birmingham, Ala., and shipped in hopper-bottom cars to Whatley where it was unloaded by a conveyor into trucks. An average of six trucks spread the slag in three lanes to cover the pavement width. The rubber-tired rollers were used to impress the slag into the bitumen. As each lane was covered with

slag, traffic was permitted to use that much of the road. The gradation of the slag is as follows:

Sieve Size	Per Cent Passing
1-inch	100
$\frac{3}{4}$ -inch	80-100
$\frac{1}{2}$ -inch	0-10
No. 4	0-3

The plant-mix which is being laid

on top of the 22-foot surface treatment is mixed in a Barber-Greene portable continuous mixer having a capacity of 60 tons per hour. Whatley was chosen for the plant site, and the AC-12 asphalt for the mix is shipped there in tank cars from the Standard Oil Co., at Baton Rouge. Gravel, one of the aggregates  
(Concluded on next page)

## Davey Valves Assure PERMANENT PEAK EFFICIENCY

Any compressor will run perfectly when it is new... and will produce its rated air capacity.

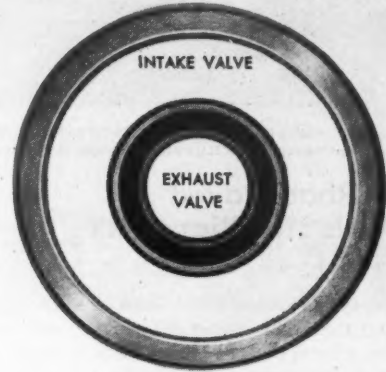
The real test of quality comes with increasing age... the manner in which a unit operates after 5-10-15 years of service. This depends 100% on valve efficiency.

In Davey Compressors permanent peak valve efficiency is the result of providing a ready path for heat removal through aluminum alloys. These alloys transmit heat through their mass three times as fast as cast iron.

Consequently, Davey units operate at constant peak efficiency—longer and more economically.

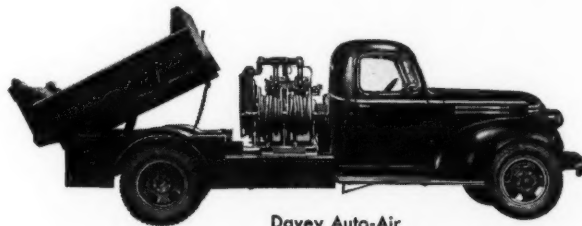
Davey is your best compressor investment—both for today and tomorrow. See your Davey dealer now. Ask him to tell you more about Davey valves—also, how vibration has been "engineered out" of the Davey line for '47.

P & P-115



**AFTER 13 YEARS** of continuous service, these valves were recently removed from a Davey Compressor.\* Their peak-efficiency condition is attested by the absence of carbon or pitting. Note how they have obviously seated perfectly—the complete absence of any signs of leakage... after 13 years.

\*Owner's name on request.



Davey Auto-Air Model 105

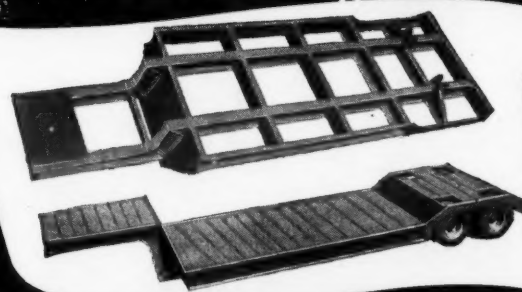


Davey Air Chief Model 210

# DAVEY

**DAVEY COMPRESSOR CO.**  
KENT, OHIO

## All WELDED for Maximum STRENGTH



To meet the demand for a rugged, extra sturdy trailer design... the La Crosse Trailers are ALL WELDED... the entire frame... from the 2 full length heavy duty main beams to the cross members and outer channels... is welded to assure a maximum of flexibility.

Dealers in 48 States



**LA CROSSE**

LA CROSSE, WISCONSIN



C. &amp; E. M. Photo

A Hell 8-yard scraper, pulled by an International TD-18, makes a cut in the roadway excavation between Grove Hill and Monroeville, Ala. Here the average haul is 500 feet.

## Gravel Road Paved With Hot Plant-Mix

(Continued from preceding page)

of the mix, is purchased from near-by sources, but the other ingredient, sand, comes from a local deposit. From 15 to 17 gallons of bitumen is mixed with 1 ton of aggregate which is graded as follows:

Sieve Size	Per Cent Passing
3/4-inch	100
3/8-inch	85-100
No. 4	40-90
No. 10	20-70
No. 40	5-35
No. 200	0-10

Two Barber-Greene Tamping-Leveling Finishers spread the plant-mix at the rate of about 80 pounds to the square yard, or an average of 3/4 inch thick. The Finishers work approximately 100 feet apart to permit traffic to cut through. Rolling is done with a

Galion 8-ton tandem roller.

### Sprigging and Sodding

Two important items in the contract which were worked on last spring were sprigging and sodding. The sprigging was done mainly on the slopes, on 12-inch centers, to check erosion. And with each acre of sprigging, 600 pounds of 6-8-4 fertilizer and 300 pounds of nitrate of soda were used. The 6-8-4 fertilizer was applied at the time the sprigging was planted, and the soda added when the sprigging first began to come up. With the sodding, which is used to a great extent for ditch checks, a mixture of 6-8-4 and soda is raked into the top 3 inches of soil in the trench before the sod is put down.

### Quantities and Personnel

The major items included in the 18.7-mile contract are given in the following tabulation:

Common excavation 392,600 cu. yds.  
Roadbed topping material 45,800 cu. yds.  
Sa. d-clay base course 145,700 cu. yds.  
Single bituminous surface treatment 262,900 sq. yds.  
Hot plant-mix 262,900 sq. yds.  
Sprigging 681,600 sq. yds.  
Sod ditch checks 12,900 sq. yds.  
Solid sodding 10,900 sq. yds.

A force averaging 42 men is employed, including 9 skilled, 8 intermediate, and 25 unskilled, under the direction of J. H. Melder, Superintendent for the McKee Construction Co. For the Alabama State Highway Department, P. B. Day is Resident Engineer. The job is located in the Sixth Division of which A. P. Villadsen is Division Engineer with headquarters at Grove Hill. The Department is headed by Ward W. McFarland, Highway Director. Marvin Taylor is Chief Engineer, Bureau of Construction.

### Heads Clay-Pipe Group

G. Lawrence Avery, head of the Le-high Sewer Pipe & Tile Co., Fort Dodge, Iowa, is the new President of the National Clay Pipe Manufacturers, Inc. He opened a recent three-day meeting

of the association in Akron, Ohio. Over 100 members attended.

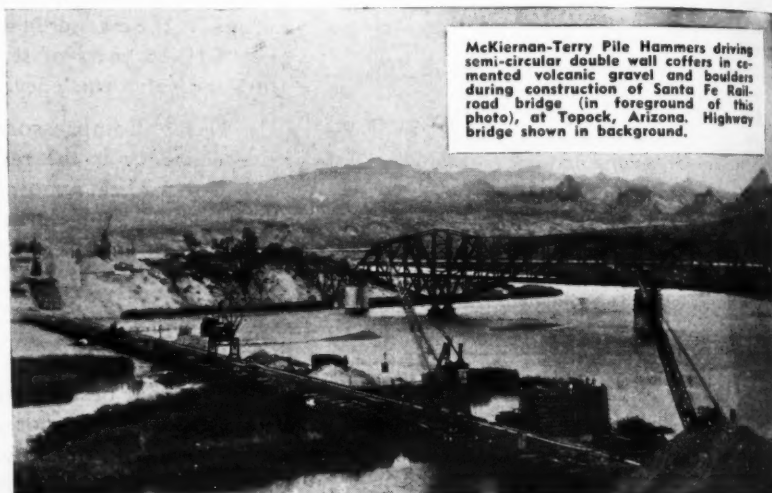
### Welding Equipment

A complete line of welding and hard-facing rods is made by the American Agile Corp., 5808 Hough Ave., Cleveland 3, Ohio. Feature of the line is the Agile alloying process said to prevent the penetration of oxygen and nitrogen into the melted weld metal.

In the line are all-position rods; general-purpose and sheet-metal electrodes; fillet-weld electrodes for mild-steel horizontal welding; rods for welding thin-gage sheet metal in horizontal or downhand positions, cold-rolled steels, sulphur-bearing and free-machining steels; hard-facing and hard-surfacing electrodes; etc.

Welding accessories made by Agile include helmets, handshields, welding cable, and Metaklad lenses.

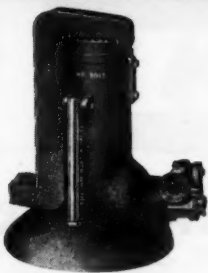
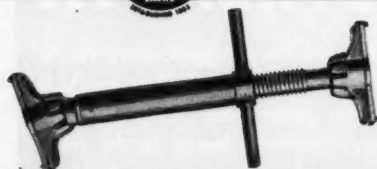
Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 7.



McKiernan-Terry Pile Hammers driving semi-circular double wall coffer in cemented volcanic gravel and boulders during construction of Santa Fe Railroad bridge (in foreground of this photo), at Topock, Arizona. Highway bridge shown in background.

## DUFF-NORTON JACKS SPEED UP WORK ON EVERY CONSTRUCTION JOB

Contractors and construction engineers find Duff-Norton's complete line of Jacks ideal for building or repairing bridges, constructing or wrecking buildings, rigging and all heavy lifting, lowering, pushing or pulling of steel girders, plate, machinery, etc. required on construction jobs.



THE DUFF-NORTON MFG. CO.

PITTSBURGH 30, PA.

SEE YOUR ASSOCIATED EQUIPMENT DISTRIBUTOR

WRITE for Catalog 203A, for complete data on jacks that help speed up construction jobs.

## BRIDGE BUILDING PROBLEMS

### Handled Dependably

Whatever the soil penetration difficulty may be, whether sand, clay, compacted gravel or any other substance, contractors always know that McKiernan-Terry Pile Hammers will handle the job right. For more than fifty years McKiernan-Terry equipment has been a first choice on construction projects of every type calling for dependable foundation work.

A complete, standardized line of McKiernan-Terry Pile Hammers and Pile Extractors is now available for speedy delivery. Double-Acting Hammers in a range of ten sizes; double-acting extractors in two sizes; single-acting hammers in five sizes.

### PILE HAMMER DATA FOR YOUR FILES

Write for McKiernan-Terry Pile Hammer Bulletins No. 55 and No. 57, and keep this valuable pile-driving information handy. Send today.

# McKiernan-Terry

CORPORATION

Manufacturing Engineers

19 PARK ROW

NEW YORK 7, N. Y.



## State Master-Plans Its Own Expressway

**Aerial Photos the Only "Outside" Help; From Them State Engineers Map Route Through Congested City**

JACKSONVILLE, located in the northeast corner of Florida, is the largest and probably the most traffic-congested city in the state. Its more than 200,000 inhabitants live on both banks of the St. Johns River that flows through this southern metropolis. The bulk of the population lives on the left bank of the river where it makes a double right-angle bend about 20 miles above its mouth on the Atlantic coast.

Two of the nation's great north-south highways, U. S. 17 and U. S. 1, enter the city from the north and leave it on the south, while U. S. 90, the Old Spanish Trail, begins at Jacksonville and ends in western Texas. The city is also a hub for several state highways that radiate from this industrial and commercial center. All these avenues of transportation have helped build up a congestion in the narrow downtown streets which slows through traffic to a crawl as motorists tool their way through town.

A solution to this problem, on paper anyway, has been advanced by the Florida State Road Department. It is a proposed interstate highway with limited access through Jacksonville. This expressway would not by-pass the city. Neither would it constitute an enlargement or improvement of any of the existing arteries of travel. It would have its own new right-of-way to carry the highway at grade in the less congested areas, and in depressed sections through the business area so that cross streets would pass over it on bridges.

The most interesting feature of the project at this stage is perhaps the planning itself. Such big-scale programs are usually turned over to firms of consulting engineers. These, with a staff of experts, evolve a master plan for the community, complete in book form with maps, text descriptions, landscape renderings, and a rough estimate of what the job will cost.

In this case, however, the plan has been worked out in its entirety by the Research and Records Division of the State Road Department with its regular complement of employees. The only "outside" assistance has come from a set of aerial photographs which served as a base from which the final plan was developed.

### Aerial Surveys

In December, 1946, Holmberg Aerial Surveys of Washington, D. C., photographed from the air a north-south section through Jacksonville 16 miles long and 9,000 feet wide. Prints of this area were turned over to the Road Department which did all the subsequent work in getting out the final plan which shows the location of the proposed route.

Corrections were first applied to the aerial photographs, mosaics made, and new prints nearly twice the size of the originals were produced, having a scale of 200 feet to the inch. These were used as working drawings, with different street or curb lines as control points.

In selecting the general location of the proposed route, origin and destination surveys were taken and their findings well sifted and analyzed. Economic, zoning, and land-use maps were thoroughly studied. And particular attention was given to the low-cost land areas in order to get an alignment that would not be financially prohibitive. Finally when the specific location was deter-

mined, the master plan was worked up in book form with its contents numbering about 100 pages.

From the aerial photographs, maps have been made on a scale of 400 feet to the inch, showing the detailed route of the Interstate Highway. These maps are on 12 x 34-inch sheets; each shows a 2-mile section with an overlap on each end. As the book measures 9 x 12 inches, the maps are folded four times. Besides these maps, which will have the expressway superimposed on them, the master-plan book will contain various charts and statistical studies pertinent to the project.

### Limited-Access Route

The new route begins at a point on U. S. 17 north of the city but then follows its own right-of-way lying west of this highway. The expressway will cross Trout River on a new bridge. Then as it goes south into the city proper it will drop from ground level to the depressed section. Though con-

(Concluded on next page)



**ON THE BEAM!**  
with  
**TUTHILL GUARD RAILS**

Efficient: easily-seen, spring-mounted convex panels cushion and deflect blows.  
Quick Installation: panels cut to convenient lengths, wide-spaced posts. Economical: reasonable initial cost, easily installed, long life.

**TUTHILL SPRING CO.**  
762 W. POLK STREET, CHICAGO 7, ILLINOIS



**REMEMBER!**  
Winter is closer than you think,  
if you need snow removal equipment

**ORDER YOUR WALTER SNOW FIGHTERS NOW!**

**CHOOSE WISELY!** Snow removal equipment is one of your most important purchases—in terms of cost and community winter safety.

Get the most from your investment by choosing Walter Snow Fighters—the fastest, surest, most thorough snow removal method under all winter conditions. And get the year-'round bonus of Walter's great power and non-slip traction for maintenance and hauling jobs—on or off the road.

**ORDER EARLY!** The peak demand for Walter Snow Fighters is just ahead. Order NOW and let us schedule your equipment for delivery before snow-time. Your Walter distributor is glad to discuss your needs and explain the many valuable Walter advantages. Detailed literature sent upon request.

### Advantages of WALTER SNOW FIGHTERS

• No slipping, stalling or wheel-spinning, because the exclusive 4-Point Positive Drive delivers power to each of four driving wheels according to its traction at any instant.

• Clear 28 foot widths in one run; clear at speeds up to 30 mph.; throw snow far to the side, making widening out easier; buck through deepest drifts.

• Models from 125 to 350 hp., available with correctly designed offset V-plows, one-way plows, speed plows, center scrapers, sand and chemical spreaders according to needs.

**WALTER MOTOR TRUCK COMPANY**  
1001-19 IRVING AVE., RIDGEWOOD 27, QUEENS, L. I., N. Y.

**WALTER**  
SNOW FIGHTERS





## State Master-Plans Its Own Expressway

(Continued from preceding page)

sidered limited-access, the road will have ingress and exit facilities at the main streets as it skirts the business district. A new 4,000-foot bridge, upstream of the two now crossing the St. Johns River into South Jacksonville, is included in the plan.

Besides the two river crossings, this 14-mile north-south section is designed with thirteen other bridges; three are viaducts over railroads and the others carry major streets. Only one crossing at grade is left in the plan; this is in South Jacksonville where other highways may enter the system.

On the south the route ties into U. S. 1 below the city. An east-west spur through the metropolitan area connects with U. S. 90 west of the city line, and ties back to the north-south route at the left bridgehead. The cross-town route will be 4 miles long and will have two overpasses. Both sections will have a total of approximately 2½ miles of bridges.

### Financing the Project

The general plan as worked up by the state engineers covers primarily the selection of the best possible route and other data such as a parking study in downtown Jax. But it includes no suggestions for financing this proposed \$34,000,000 express-highway program.

City officials, not unnaturally, would like to see the project built and financed by the State. They have also considered an offer by a Florida improvement commission to finance 80 per cent of the cost by issuing revenue certificates covering from \$20,000,000 to \$22,500,000. That is, provided Duval County, in which Jacksonville is located, would pledge tolls on the two main river crossings. An alternate proposition suggested that the County turn over its share of the state gasoline tax to the commission.

So far the City and State have definitely agreed on the alignment for the new route, but the financing is still up in the air. The actual construction of the project will require about five years. In the meantime the Public Roads Administration has taken a keen interest in the master plan as worked up entirely by the State Road Department. It has ordered stacks of copies to send around the country to other states and cities which have similar problems to work out. The Jacksonville Metropolitan Area survey has demonstrated that complete yet low-cost master plans for expressways through large cities can be developed by the regular staffs of state highway departments.

The Research and Records Division of the Florida State Road Department is headed by W. M. Parker. F. Elgin Bayless is Chairman of the Department and E. C. DeGarmo is State Highway Engineer.

## Surveyors' Levels

Levels for use by surveyors and contractors are available from Leupold & Stevens Instruments, 4445 N.E. E. Glisan St., Portland 13, Oreg. Among the products which this firm makes are hand, Abney, and builders' levels.

Feature of the hand level is an adjustment which permits magnification of the level bubble to suit each individual eye. The instrument is 5¼ inches in length and ¾ inch in diameter.

This feature is also available on the Abney levels. In addition, the design of the Leupold Abney level is said to permit changing from one gradation to another without reversing the frame. The standard-model Abney has two gradations; however, units can be obtained with all three gradations—percent, topographic, and degrees. Length overall is 6½ inches; radius of arc is 1¼ inches.

In addition to doing the work of a level, the builder's level will also turn horizontal angles and can be used for plumbing vertical lines, says its manufacturer. The telescope is 13 inches long, and has a magnification of 18 to 20 diameters. The spirit level is 5¼ inches long. The horizontal circle has a 3¼-inch diameter. The telescope is removable from its wye arms for clamping to auxiliary standards to provide vertical tilting. Weight of the instrument is 9 pounds; of the tripod, 7 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 35.

## Represents Buda in Ohio

Fred W. Sparks has joined The Buda Co. as district representative to handle the Engine Division's Ohio territory. He was formerly with the Euclid Road Machinery Co. and The Cummins Engine Co.

## Pneumatic Equipment

A line of pneumatic equipment is described in catalogs issued by the Curtis Pneumatic Machinery Division of the Curtis Mfg. Co., 1905 Kienlen Ave., St. Louis 20, Mo. Bulletin CAS-4 deals with single-cylinder single-stage compressors, duplex single-stage compressors, and two-stage compressors. Bulletin CAS-2 covers Models V and Q single and two-stage compressors, the VP single-stage, VG gasoline-driven

units, and the W single and two-stage units.

Bulletin C-4-D discusses the Model C compressors. Its sectional views illustrate the construction of this line. Design details are also illustrated and

described. Bulletin A-4-B discusses the Curtis line of air hoists, air cylinders, and valves.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 86.

## Flink SELF FEEDING SPREADER

- Spreads all materials to 1"
- Spreads thick or thin as desired
- Attaches to truck as a tailgate
- Does not limit use of truck
- Clutch controlled from cab
- Starts spread with truck in motion
- Stops spread with truck in motion
- Self feeding—no helper on back
- Spreads forward or backward
- Half or full width of street
- Reduces number trucks required
- Positive uniform spread
- Fits any dump truck
- Thousands in use



Makes you a Spreader and Dump Truck Combined  
Use fewer men—trucks—time. . . . The practical, economical, efficient Flink spreader that has proved itself in a thousand tough road construction and maintenance jobs. . . . in ice control and dust control all over America. Write for complete information.

THOUSANDS USED BY CITIES, COUNTIES AND STATES

Flink Co., Dept. CE, Streator, Ill.



## with PLASTIC ROCK!

Plastic Rock comes complete, packed in barrels. Nothing more to buy. No application "formula" to confuse. Simply mix and trowel right over old floor; average depth one-half inch. Old floor Saturday is a new floor Monday. Plastic Rock is absolutely spark-proof, skid-safe even when wet, dustless, silent. Feels like cork under foot. Cannot splinter,

crack, crumble, curl or loosen. Also patches concrete to a perfect feather edge. Heavy loads on steel wheels actually improve it. Five-year-old floors show no wear. Used by largest railroads and industries in America. Over 600 contractors have found Plastic Rock a good-will builder and profit source. No special equipment needed. Not for home use.

Ask for comprehensive and convincing Report 220-C-8

UNITED LABORATORIES, INC.  
16815 EUCLID AVENUE • CLEVELAND 12, OHIO  
In Canada—STORRER MFG. COMPANY, Weston, Ontario  
Representatives everywhere, including foreign countries

## SAVE MONEY ON FORM LABOR

**COST: Only 3.2c On This Job**

Per Square Foot For Stripping and Erecting

Perfect Concrete Job • Smooth Finish • No Fins With Atlas Steel Forms

### Erection Time

Including Crane Operator  
Outside Form: 4 Man Hrs.  
Inside Form: 5 Man Hrs.  
Outside man hours 9  
Inside man hours.11  
**TOTAL**  
Man Hours.....20

**20 MAN HOURS**  
@ \$1.75 = \$35.00

### Stripping

Cleaning and Moving  
Outside Form: 5 Man Hrs.  
Inside Form: 6 Man Hrs.  
Sq. Ft. Outside.. 600  
Sq. Ft. Inside..... 492

**TOTAL Sq Ft..1092**  
1092 Sq. Ft. or  
3.2c per Sq. Ft.

### Erection Procedure

1. Bottom belt channel set is erected.
2. Two lifts of forms are bolted with special no-thread wedge bolts.
3. Top belt channel sets are erected. Note the clear opening through the forms.

### Stripping

1. The bottom belt channel set is removed.
2. The two lifts of the form panels are removed.
3. The top belt channel set becomes the bottom belt for the next lift.



CAISSON SHAFT—100 FEET DEEP. INDIANA ORDNANCE PLANT, CHARLESTON, IND. RANNEY WATER COLLECTOR CO. OF N. Y., Contractor  
Send us plans of the job. Let us show you what Atlas Steel forms will save for you

## Concrete Forms Corp.

50 John Street  
New York City Sales Office  
Room 1103, 43 Cedar St., N. Y.

Irvington, New York  
Telephone:  
Bowling Green 9-4030



## New Vertical-Lift Bridge Poses Footing Problems

(Continued from page 1)

and 175 feet high when raised, will measure 272 feet from the center line of towers. Concrete counterbalances in the towers will make the operation of the span smooth, and it is expected that it can be raised in 100 seconds. Ice on the trolley cables, which has been such a problem on the Duluth, Minn., Aerial Lift Bridge, will not be present here.

Water-borne traffic under the bridge consists of tugs and seagoing ships. Sometimes these vessels choose to use Cerritos Channel, connecting Long Beach and San Pedro Harbors, instead of steaming out through the open sea.

### Cofferdam Work

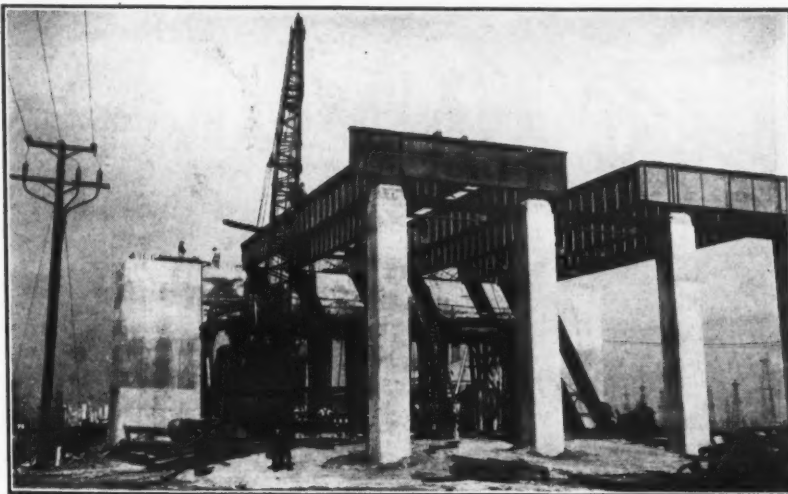
Perhaps the trickiest, most dangerous, and heaviest work on the job has been the problem of building a cofferdam around the tower footings and keeping it dry. MZ-type steel sheet piles 70 feet long were ordered from eastern mills, since none were stocked in Los Angeles warehouses. When enough of these sections arrived to build a 60 x 120-foot cofferdam, the job had been delayed several months.

The cofferdam location was flagged off and a Northwest Model 80-D crane, carrying a 2½-yard clamshell bucket, was brought in on a 50 x 100-foot wood barge. A hole 50 feet below low-tide elevation was clammed out. Sand and mud beyond the previous depth of 35 feet was dumped in a scow, and this material was unloaded in deep water.

Some 390 standard 14-inch 73-pound-per-foot H-beams were then driven in place under the first footing. These piles were furnished by the Navy from surplus stocks assembled from various points in the country in an attempt to beat the materials shortage sufficiently to get the job under way. They were driven by a floating pile driver using a McKiernan-Terry 11B3 double-acting pile hammer. Steam lines and the exhaust outlet on this hammer were so extended that pile driving could be carried on down below the water, allowing the H-beams to be driven to 40 tons of bearing per pile. The ENR bearing formula, with a factor of S+0.1, was used in calculating bearing values at the hammer.

Special support piles were also driven to carry the first structural frame, designed to brace the inside of the cofferdam. After they were driven they were cut off to a common elevation at minus 28, referred to mean low lower-water datum. This work was done by divers.

The structural brace frame was then lowered into place on the foundation piles, with the divers assisting. It consisted of three tiers of bracing, weighed 20 tons, and was composed of 14-inch H-beams with 10-inch channel stiffeners. It had been completely assembled



C. & E. M. Photo

Steel girders on the bridge will support timber shoring under the concrete deck. At alternate bents are concrete pedestals without a beam—a full-floating design feature of the bridge to take into account differential movement of the earth's crust.

on a barge and floated into place. After it had been checked for elevation and

location, the steel sheet piles were brought in and driven around the

frame. A 50C Vulcan pile hammer drove the MZ sections of sheeting.

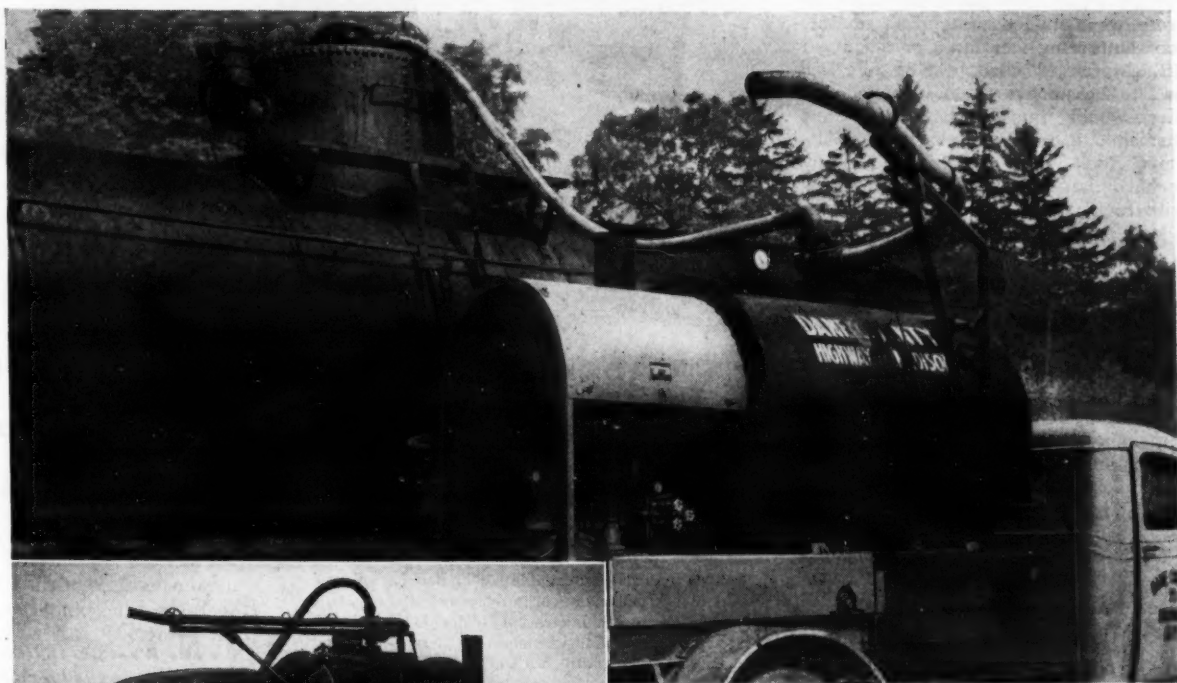
### Placing Concrete

Plans called for a solid pad of Class A concrete 15 feet thick, with the top 5 feet reinforced, to be placed in the bottom of the hole. After some discussion, the foundation subcontracting firm of Proctor & Kuhn elected to place the first 10 feet of the tremie slab, under a 50-foot head of water, with the aid of a Pumpcrete machine. The next lift of 5 feet was to be placed in the dry.

In practice, the first lift did not go in exactly as planned. Concrete was pumped through two 8-inch pipes to the bottom of the tremie slab. However, instead of building up from the center towards the outside, under pressure, to form a uniform layer, the concrete built up in cones. It had been assumed that the tremie pipe would have to be moved hardly at all. But it was necessary to make repeated moves with the help of the Northwest barge-mounted crane

(Continued on next page)

## All hooked up and ready to deliver hot oil . . . fast!

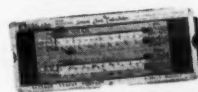


You Get All the Hot Material  
You Need Right When You Need It—  
With Cleaver-Brooks Portable Boosters

**C**LEAVER-BROOKS Portable Pumping Boosters get pumpable bituminous materials out of tank cars and raise it to desired temperatures in almost unbelievable speed.

With Cleaver-Brooks Boosters, the heating speed does not depend on the size and conditions of tank car coils. It heats direct and 3 times as fast as any other method. What's more, you need only heat the amount of material you need—no heating of the entire car.

Cleaver-Brooks Boosters are reliable, long service, low maintenance units. Most of the original models, built 15 years ago are still giving dependable every day service. There are more Cleaver-Brooks units in service than any other make. For full details write for bulletin RM 102.



Write on Your Business Letterhead . . .  
For the Bituminous-Mix Calculator—a ready reference slide rule showing weight of mix needed in lbs. and tons based on area and depth of area to be covered.

**CLEAVER-BROOKS COMPANY**  
5110 NORTH 33rd STREET • MILWAUKEE 9, WISCONSIN

Truck-mounted Booster. Heats by direct firing. Loads direct to distributor or returns to tank car. 2 sizes for truck or trailer mounting.



### Check These Advantages

- Heats material 3 times as fast as steam.
- Heats to higher temperatures.
- No steam or water necessary.
- Heats only amount of material required.
- Circulates material while heating—no separation or damage—assures uniform application.



### HOISTS DERRICKS WINCHES

A Complete Line of Builders' Derricks and Winches—nationally known for dependable service and long life.

Write for Catalog or send your problems to our Engineering Department



The Sagen line is handled by leading equipment distributors everywhere.

**SAGEN DERRICK COMPANY**  
3101-27 W. Grand Avenue, Chicago 22, Ill.

# Cleaver-Brooks

PIONEERS AND  
ORIGINATORS OF

TANK CAR HEATERS...BITUMINOUS BOOSTERS...AUTOMATIC STEAM PLANTS



## New Vertical-Lift Bridge Poses Footing Problems

(Continued from preceding page)

and a Browning truck crane to prevent the concrete from building up beyond the top of the bearing piles and into the area where reinforcing steel would have to be placed. Despite the best efforts, however, it was known when the pour was finished that excess concrete had been placed and would have to be removed.

Since the steel sheeting had only 10 feet of penetration in the channel mud, with a 50-foot hydrostatic head pressing in from all sides, it was decided to let the 10-foot layer of concrete in the bottom of the hole set for three weeks prior to unwatering.

Two Byron Jackson deep-well turbine pumps, one an 8-inch and one a 12-inch, were set permanently in place on opposite sides of the cofferdam. Electric power from the Terminal Island lines was brought out on temporary poles, and the high-capacity pumps removed the water in about 14 hours. The excellent job of driving the sheet piling plumb, with a minimum of interlock opening, permitted these two pumps to keep the hole dry quite easily, operating at about 45 per cent of their capacity.

When the unwatering was done, it could then be seen that mounds of concrete were indeed protruding up into the reinforcing-steel area of the upper lift. Moreover, each bearing pile still had to be uncovered and capped. In three weeks' time the Class A concrete furnished in truck-mixers by Consolidated Rock Products Corp. had set up so hard that extensive jackhammering with rock gads was necessary. It was a slow and costly process, but the excess concrete was all finally bailed out.

When a similar pad was poured on the other tower footing, it was placed by standard tremie pipes and controlled by divers.

Steel reinforcement and pile caps were set in place in the top lift, and a different system of placing was used. In placing the top layer of the footing it was possible for men to work in an unwatered hole instead of having to pour "blind" as was the case on the lower lift.

To permit distribution of concrete



C. & E. M. Photo

This shows the steel pile cofferdam, details of bracing inside it, and a load of tower form lumber being lowered. The bridge which appears in the background will be replaced by the new structure.

from large central hoppers to secondary hoppers, United Concrete Pipe Corp.

developed for this project a swiveled spout. Placed under a standard 2-yard

hopper, this spout can be turned easily by one man. It diverts concrete to a series of fixed chutes which lead to the smaller secondary hoppers spread over the area of the pour. This innovation worked so successfully on the upper layer that it was used later when the other footing went in.

With all hoppers, chutes, and elephant trunks set in place, a fleet of UCP-owned Jaeger truck-mixers began to haul concrete from the central mixing plant of Consolidated Rock Products Corp. about 2½ miles away. The truck-mixers discharged their loads of concrete to a 60-foot conveyor belt. One end remained stationary on the working platform, accessible to the shore, and the other end was switched from hopper to hopper by a Manitowoc Speedcrane.

From 80 to 100 cubic yards of concrete was placed per hour in this way. Several Viber electric vibrators helped to consolidate the concrete in place around the steel. Despite a 50-foot

(Continued on next page)

# TNT

on

## ONLY 4½¢ per lb.!

**Approximately 25,000,000 pounds available on continuous sale. Sale to priority groups closes Sept. 2, 1947**

### PRICE, F. O. B. LOCATION, 4½¢ PER LB.

This material is available for immediate sale and delivery to all classes of purchasers at the following War Assets Administration Regional Offices in the approximate quantities shown. Offers to purchase may be made at any WAA office, or by letter, wire, or personal visit to any of the Regional Offices listed. If your offer is written mark your envelope "Offer to Purchase Trinitrotoluene, A-128".

WAA OFFICE	½ LB.	1 LB.
Birmingham . . . . .	—	482,000
Chicago . . . . .	—	1,160,700
Cincinnati . . . . .	21,145	3,527,595
Denver . . . . .	1,202,900	463,841
Grand Prairie, Texas . . . . .	—	693,870
Los Angeles . . . . .	—	867,630
Minneapolis . . . . .	—	1,600,530
Nashville . . . . .	1,616,600	—
New York . . . . .	—	50,000
Omaha . . . . .	1,064,900	1,843,200
Philadelphia . . . . .	—	1,170,000
Portland . . . . .	27,556	1,436,024
Salt Lake City . . . . .	341,980	8,320,745
San Francisco . . . . .	45,710	51,747
St. Louis . . . . .	8,500	—
	4,329,291	21,667,882

This is a concurrent and continuous sale, 10% reserved for Federal Agencies and Priority Claimants until September 2nd. All orders received from priority claimants will be filled from the reserve. Non-priority orders will be filled immediately upon receipt.

This material is offered, as is, subject to inspection by purchaser at location, without expressed or implied warranty except as to title. WAA reserves the right to reject any or all offers, and to make awards in whole or in part. All items subject to prior withdrawal.

Purchasers of Trinitrotoluene are required to observe all applicable laws regulating the sale, use, handling and storage of explosive materials.

Purchaser's order must state thereon: (a) "This order is subject to War Assets Administration Standard Conditions of Sale, and all other advertised terms and conditions, and no other terms or conditions should be binding on War Assets Administration"; (b) Type of business and level of trade. Orders from veterans must show certification date, case number and location of certifying office.

• **T.N.T.** is relatively insensitive to shock and is one of the most stable of the high explosives. For many blasting operations it is superior to dynamite.

• **T.N.T.** does not deteriorate like dynamite and turning, to prevent deterioration, is not required. It can be stored over long periods of time and can be handled and shipped with comparative safety.

• **T.N.T.** burns at 266 degrees F. and can be burned in the open in small quantities without exploding. If burned in confinement or in large quantities, it explodes.

• **T.N.T.** is insoluble in water and may be used in underwater charges. It is non-hygroscopic and does not form sensitive compounds with metal.

### USES

T. N. T. can be used wherever 40-60% dynamite is employed with the exception of underground operations or for use in closed spaces because its explosion produces poisonous gases.

It can be used for swamp drainage and is highly efficient in quarrying, above ground mining, road construction, soil conservation, mud capping, stump removal, seismographic surveying, and for "blowing out" oil well fires.

The use of Primacord (in place of caps) on each block of T. N. T. is recommended. Then there is no danger of detonating unexploded caps when clearing holes.

OFFICE OF GENERAL DISPOSAL

## WAR ASSETS ADMINISTRATION

Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cincinnati • Cleveland • Denver • Detroit • Grand Prairie, Tex. • Helena • Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles • Louisville • Minneapolis • Nashville • New Orleans • New York • Omaha • Philadelphia • Portland, Ore. • Richmond • Salt Lake City • St. Louis • San Antonio • San Francisco • Seattle • Spokane • Tulsa

Customer Service Centers in these and many other cities.



## HUMDINGER SELF-PRIMING CENTRIFUGAL PUMPS

You've never seen a self-priming centrifugal pump that will move so large a volume of water as efficiently and with as little maintenance as the new "Humdinger" 6" Model 90MCC.

Combining all the features of large air capacity, simplicity and rugged construction with the exclusive CARTER ball type priming and co-axial volute, this unit is guaranteed to give you unfailingly satisfactory service.

For complete details, write for Bulletin 4503.

**RALPH B. CARTER CO.  
HACKENSACK, NEW JERSEY**

51 PARK PLACE, NEW YORK 7, N. Y.



## New Vertical-Lift Bridge Poses Footing Problems

(Continued from preceding page)

drop from the truck-mixers to the final resting place, the concrete was placed successfully without segregation of aggregate.

Of great advantage was the fact that nothing had to be changed, after a pour commenced, but the swivels under the main hoppers. Once a pour was set up it could then proceed without interruption.

At the time the job was visited for *CONTRACTORS AND ENGINEERS MONTHLY*, the 15-foot pad had been poured and preparations were under way to start on up with the tower concrete. Until this work could be advanced above the water line on the south pier, the steel cofferdam had to remain in place with the Byron Jackson pumps working. As soon as possible this cofferdam was extracted, and the whole process repeated on the north pier. Parts of the old temporary Navy-built bridge are serving as access to the high piers or towers of the new span.

A very small amount of sheeting was also required for the short piers on each shore line, in order that water might be sealed off from the work.

### Approach-Pier Concrete

A lengthy approach structure at both ends of the new bridge will be carried on reinforced-concrete bents. These bents contain four reinforced-concrete columns each, and rest on a reinforced pad 10 feet wide, 75 feet long, and 6 feet thick. Columns are 42 and 48 inches square, depending on their height. Span centers between these bents vary from 60 to 93 feet.

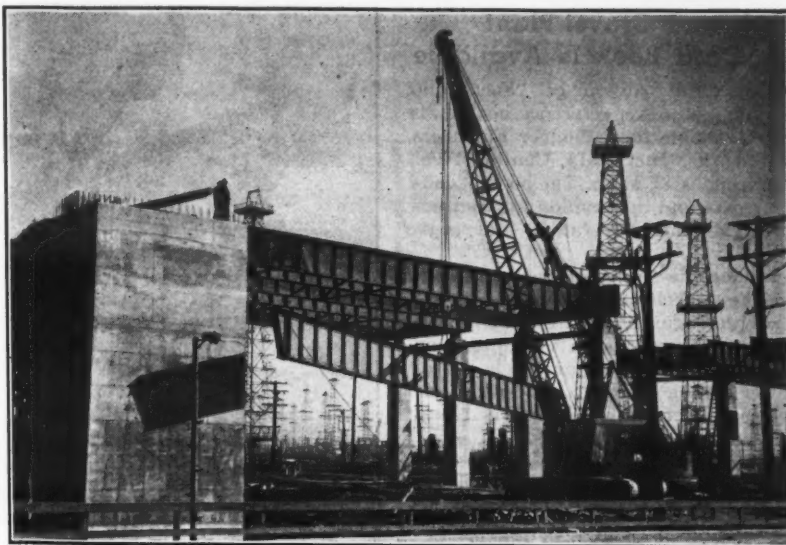
Much of this work was done early during the job while waiting for steel deliveries. Bents were poured by using truck-mixed concrete for the footings, and hoisting the concrete in a Gar-Bro bucket on a Speedcrane for the column pours. All exposed edges of the bents were chamfered, and plywood facing was used for the form work, above ground. All of the concrete work in this connection was done by the prime contractor.

Anchor bolts were seated on the tops of the columns to catch the headers of the alternate anchored structural girders. When this structural framework is securely anchored and in place, the steel will be used to support timber shoring under the concrete roadway decking. Except for 155 tons of steel floor grating on the vertical-lift span, all roadway surfacing on the bridge and its approaches will be concrete.

Including the roadway slab, there are approximately 43,500 cubic yards of concrete in the project.

### Structural Steel

A subcontract for furnishing and



C. & E. M. Photo


A Manitowoc Speedcrane owned by American Bridge Co. raises into place a 24-ton structural girder for the Terminal Island Access Freeway Bridge. American Bridge is doing the field erection work on this job.

placing 10,000 tons of structural steel was let to Columbia Steel Co., a subsidiary of U. S. Steel, and the placing of girders has started. American Bridge Co., a sister company of Columbia Steel, is doing the field erection work.

Structural members are being shipped in railroad cars, coated with a rust-preventive treatment of red lead paint, and unloaded on a spur near the job. Three Manitowoc Speedcranes are being used to handle the steel.

The heaviest pieces placed when the job was visited were the 24-ton girders, six for each fixed span. A Speedcrane with extra-long and wide tracks was used to place them. It easily handles up to 50 tons with its 50-foot boom at short radius. Preformed-wire-rope slings are being used because the outer wires of this improved cable will not break and rise up to cause bad hand punctures. Where the sling bends sharply around the base of the girders, steel pipe softeners are being used to make the job as safe as possible.

(Concluded on next page)




# JAEGER COMPRESSOR

**get your air costs**

**down to today's**

**Jaeger figures**



**Here's why Jaeger air COSTS LESS . . .**

75% to 100% larger "Tough Swedish Twin" valves, ultra-lapped to leakproof closure — 20% to 30% slower, cooler piston speed — 100% efficient intercooling — force feed lubrication—balanced, precision parts — mean smoother, vibrationless performance, free air flow without the usual heat, carbon and power-wasting back pressure — more air from every pound and dollar of fuel and much lower cost of upkeep with compressor units that outlast their original engines\* 3-to-1.

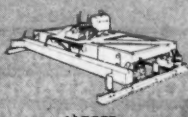
(\*Caterpillar, Continental and International powered.)

Your Jaeger distributor is today supply headquarters for contractors in your locality who are applying modern low-cost air power to their work. He handles the finest air tools, engines and compressors on the market—he knows air—he is an important link in a chain of 128 Jaeger air stations across the U. S. and Canada which give on-the-spot service to contractors wherever their jobs may be.

Ask us for the name of your nearest air station and copy of Catalog JC-5, the up-to-date buyer's guide for portable compressors of 60 to 600 ft. size.

**THE JAEGER MACHINE COMPANY, Columbus 16, Ohio**

REGIONAL OFFICES    8 E. 48th St.    226 N. La Salle St.    235-38 Martin Bldg.  
NEW YORK 17, N. Y.    CHICAGO 1, ILL.    BIRMINGHAM 1, ALA.



JAEGER Spreaders, Finishers



"SPEEDLINE" Concrete Mixers



"SURE PRIME" Contractors Pumps

JAEGER

Engineered

EQUIPMENT

"DUAL-MIX" TRUCK MIXERS, AGITATORS — HOISTING ENGINES, SELF-RAISING TOWERS — CONCRETE AND BITUMINOUS PAVING EQUIPMENT

GENUINE  
ALL-METAL

Velvetouch

CLUTCH FACINGS AND  
BRAKE LININGS..

Now available for all tractors and earthmoving equipment. Immediate shipment. For prices and specifications see your local supply house, or write . . .

**THE S. K. WELLMAN CO.**  
1974 East 51st St., Cleveland 3, Ohio







C. &amp; E. M. Photo

United Concrete Pipe Corp. used this special concrete-dispensing hopper on the vertical-lift bridge foundations. Note how the spout is swivel-mounted, and can be turned 360 degrees to dump to chutes leading to smaller hoppers.

## New Vertical-Lift Bridge Poses Footing Problems

(Continued from preceding page)

Structural high climbers, who work regularly far above the ground without safety scaffolds or belts, live dangerously and often die with their boots on. However, the safety record of this job has been excellent, because no heavy lifts are ever hurried and the slings and machines are not being overloaded.

### Personnel

Key personnel includes Captain H. E. Wilson, (CEC) USN, Officer in Charge for the Navy Bureau of Yards and Docks. Commander J. W. Frorath is the Project Manager for the Navy, with R. A. Bell as Project Manager for the United Concrete Pipe Corp. G. L. Curtis is the contract Project Engineer.

Plans were prepared under the supervision of George T. McCoy, State Highway Engineer of California, and F. W. Panhorst, Bridge Engineer.

Completion of the Navy's Terminal Island Access Freeway Bridge will relieve traffic congestion in that vicinity, and will be of great assistance in the comprehensive highway plan of the State of California.

Approximately 100,000 gallons of white paint are used each year by the New York State Department of Public Works for traffic striping on the State's 14,000-mile highway system.

## Rock and Gravel-Plant Data Book Is Available

The ninth edition of "Facts and Figures", a pocket reference booklet, is now available from Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis 13, Minn. The booklet contains data and information for contractors, equipment operators, and engineers.

Among the subjects covered are aggregate specifications, belt-conveyor capacities, crusher settings, horsepower required for various units of equipment, screen data, weights of materials, horsepower rating of belts, safe loads on beams, conversion tables, keys and key-way data, and many others.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 61.

## How to Write a Report

Our readers who are called upon to prepare reports for technical committees and societies may be interested in a new second edition of "Writing the Technical Report", recently published. Its author is J. Raleigh Nelson, Professor Emeritus of English in the College of Engineering, University of Michigan.

Professor Nelson asks us to judge the technical report as we would any structure designed to carry its load. We must consider the use to which it will be put, and set out to satisfy the requirements of that use if we would save ourselves many failures.

In designing his own book to carry its load, Professor Nelson has divided it into four parts. The first discusses the steps involved in report writing, the functions of the introductory and terminal sections, the relation of paragraphs to the whole, sectional headings, the rough draft, etc. The second deals with the form and style of the report, figures, tables, footnotes, stenographic details, etc. The third tells us how to criticize, re-work, and evaluate what we have written, by giving examples of actual reports and revisions. It also reviews some common difficulties with the English sentence. And part four suggests ways to use the book for classroom purposes.

Copies of "Writing the Technical Report" are available from the publisher, McGraw-Hill Book Co., Inc., at 330 W. 42nd St., New York 18, N. Y. The book is priced at \$3.00.



The new Marion 33-M crawler shovel unit, featuring Marion air control, is also convertible to dragline, clamshell, crane, and backhoe service. Its capacity is  $\frac{3}{4}$  cubic yard.

## Crawler Shovel Unit Has $\frac{3}{4}$ -Yard Capacity

A  $\frac{3}{4}$ -cubic-yard convertible shovel unit is announced by the Marion Power Shovel Co. of Marion, Ohio. It can be used as a shovel, dragline, clamshell, crane, or backhoe.

Conversion can be accomplished, says the manufacturer, without changes of drum lagging, sprockets, levers, etc. The Model 33-M uses the same drums on all combinations. The shovel boom serves as boom for the backhoe; the crane boom point is adaptable without change for crane, clamshell, dragline, and pile-driver service.

Steering and propel brakes are 20 inches in diameter; the hoist and crowd brakes are 31 inches in diameter. The

swing brake is the V-block type. Marion air control covers all digging motions, gear changes, dipper trip, engine clutch, etc. A maximum of 12-pound pressure is said to operate any air-control lever. Dual crowd is standard, as is an independent high-speed boom hoist.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 34.

## Koppers Ups Gen. Minton

Brig. Gen. Hugh C. Minton, recently made Production Manager of Koppers Co., Inc., has been appointed a Vice President of the company. He will maintain his offices in the Koppers Bldg., Pittsburgh, Pa.

# Cutting WIRE ROPE is easy

- **FAST** Specially designed cutting blade and dies ensure fast cutting action. The hammer principle eliminates any special adjustments.
- **CLEAN** Wire rope ends are cut smooth and clean for perfect threading and splicing.
- **SAFE** The outstanding blade locked in the body of the cutter ensures perfect safety.
- **PORTABLE** Model for tool box or stationery operation. With cutting capacities up to 1 inch, 1 1/2 inch, 2 1/2 inch.

SEE YOUR DEALER OR WRITE DEPT. "B"

**MORSE-STARRETT PRODUCTS COMPANY**

1204 - 49th AVENUE, OAKLAND 1, CALIFORNIA



*Welded Construction*  
MAKES A BIG DIFFERENCE...

**WELLMAN**  
*Williams Type* **BUCKETS**

• Wellman leads the field in welded bucket construction. Wellman improved design means better service, lower cost for you! A type for every purpose: Multiple Rope, Power Arm, Dragline, Power Wheel, Special Service;  $\frac{3}{8}$  to 16  $\frac{1}{2}$ -yd. capacity.

SEND FOR BULLETIN

**THE WELLMAN ENGINEERING COMPANY**  
7012 CENTRAL AVENUE • CLEVELAND 4, OHIO



# Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

## Engineer Asks Damages For Wrongful Dismissal

**THE PROBLEM:** A highway contractor sought to employ a consulting and structural engineer on a Government project. After a conference with the contractor's representative, the engineer asked that the matter be held open a day or two. Two days later he telephoned the representative that he would accept employment on the terms discussed. Six days after that the representative sent the engineer a letter. In it he referred to the specific project, notified the engineer to report at a certain point about three weeks later, and stated the period of employment (nine months) and the monthly rate of pay (\$100), etc. The letter was signed by the representative as agent for the contractor.

However, before the engineer reported for duty, he was discharged from his prospective employment by the contractor. Reasons cited were that the engineer had been told the work was a military secret, that he had been instructed to regard it as confidential, but that he had given an interview to a newspaper which included information on the project.

The engineer brought suit for damages on the ground that he had been wrongfully discharged. Then the contractor appealed from a judgment for damages awarded in plaintiff's favor. The Nebraska Supreme Court ordered a new trial, on the ground that the trial judge had omitted properly to instruct the jury as to the law of the case. (Stoffel v. Metcalfe Construction Co., 17 N. W. 2d 3.)

The following questions were put to the Nebraska Supreme Court in the case: (1) Had a binding contract ever been entered into? (2) Did the reasons cited give the contractor the right to cancel an agreement to employ? (3) How should the engineer's damages be assessed, if he was unjustly discharged?

**THE ANSWERS:** (1) The Nebraska Supreme Court decided that on the facts stated earlier a binding contract was entered into; that it nullified an attempt made by the contractor's representative to withdraw the offer of employment.

(2) As for the contractor's right to cancel his agreement to employ, the court brought out the following points: Employees are bound to obey all "reasonable rules, orders, and instructions of the employer, and wilful or intentional disobedience" generally justifies peremptory dismissal. Moreover, an employee forfeits his right to employment and compensation if he fails in his duties to be loyal, diligent, and obedient. However, the court decided, the burden was on defendant-contractor to show that plaintiff had violated instructions in the above stated respect.

(3) If the engineer was unjustly accused, his damages should be assessed according to the following stated rules of law, the court decided: A wrongfully discharged employee is entitled to collect the amount that he would have earned during the unexpired time his contract was to run, less what he has earned, or with reasonable effort could have earned in the same or similar kind of employment. Want ads in a contractors' trade journal, seeking employees for jobs which differ essentially from the kind from

which the employee was discharged, do not constitute evidence that he could have reduced his damages by accepting other employment.

## Two Employers Liable For Employee's Death

**THE PROBLEM:** An excavating contractor leased a truck-mounted shovel for use on a specific job in New York. The lessor furnished an operator and an oiler, two of its regular employees. They were carried on the contractor's payroll while working on the job, but were to return to the lessor's general employment with the shovel.

The contractor did not exercise any control over the oiler, who was accidentally killed by the shovel shortly after excavating on the job started. Who was liable for compensation awarded the deceased employee's widow under the New York Workmen's Compensation Act?

**THE ANSWER:** According to the New York Court of Appeals, the award was properly made jointly against the contractor as special employer, and against the lessor as general employer. (Dennison v. Peckham Road Corp., 68 N. E. 2d 440.) The court recognized that a worker may be so employed as to bear the relationship of employee to his general employer while temporarily engaged in the service of a third party, and so make a workmen's compensation award against both employers proper.

## Plan-Approval Delay Delays Construction

**THE PROBLEM:** Was delay in construction excusable under these circumstances: The contract required the chief architect's approval of plans. Subcontractors submitted blueprints for that approval. The architect knew these were submitted in compliance with the contract, although it was customary to submit original drawings; he referred them to his assistant. But the assistant laid them aside, mistakenly supposing that the blueprints covered plans previously acted upon by him. A delay of 45 days resulted.

**THE ANSWER:** Yes, said the United States Court of Claims. (United States Casualty Co. v. United States, 67 Fed. Supp. 950.) But the Government, the owner, was contemporaneously guilty of delaying the contractor 40 days for another reason. So only 5 days should be charged to the delay caused by the architect.

## When Partners Fall Out

**THE PROBLEM:** Can anyone, even blood relatives, safely form a profit-sharing enterprise without putting in writing all essential terms of their agreement?

**THE ANSWER:** No, if we are to judge from a recent case in the California District Court of Appeal, in what promises to be only the first round of a legal battle. (Breedlove v. Breedlove Excavating Co., 132 Pac. 2d 239.)

One brother sued another and the latter's wife for a partnership accounting. He demanded that a receiver be appointed for an excavating contracting business which plaintiff claimed all three had conducted as partners. Defendants denied the partnership relation, asserting that plaintiff had been a mere employee.

In the face of these conflicting claims, the trial judge decided that a receiver should be appointed to take over pending trial of the suit. The District Court of Appeal upheld the trial judge's order, saying:

"If, as stressed by him, plaintiff was a partner and had been deprived of his right to share in the profits of the enterprise, he was entitled to the assistance of the court in having the funds and earnings of the partnership impounded and conserved, and in having the property protected from threatened loss and injury."

Engines FROM 90 to 215 HP. Generators FROM 60 to 115 KW

More Power  
**MURPHY DIESEL**  
More Profit



**MURPHY DIESEL COMPANY, 5319 W. Burnham St., Milwaukee 14, Wis.**

# HOLES

come easier



with  
**Mall Drills**

**MODEL 125**  
1/2 Inch Drill

It's easy to drill metal, wood or plastics with a Mall Drill. This portable electric tool has power to speed the bit through the toughest materials... stamina to withstand continuous use... and adaptability to fit every kind of drilling job. Available in capacities ranging from 1/4" to 3/8" in steel—correspondingly larger in wood—for either 110-volt AC-DC or 220-volt AC-DC.

Ask your Supplier or write Contractors' Equipment Division for literature and prices.  
**MALL TOOL COMPANY, 7743 South Chicago Ave., Chicago 19, Ill.**  
See Our Advertisement in The Saturday Evening Post—August 16

★ 26 Years of  
"Better Tools For  
Better Work"

**Mall** **PORTABLE POWER TOOLS**

## "For Heavy Loads and Rough Roads" Hughes Trailers Give Unsurpassed Performance

The frame construction is the backbone of any trailer. Improved rugged gooseneck for heavy duty, with deep, wide, flange main beams running the full length of the trailer. Reinforced cross members and outriggers are channel sections. Oscillating axles take the twist out of rough hauling. Entire frame of electric welded construction. Contact your nearest distributor or write us direct.

Prompt attention given all orders and inquiries.  
Semi or full—Straight or drop deck.  
15 to 100-ton capacity



**L. J. Hughes Co.**  
1029 Brooke Blvd., Reading, Pa.

## "NEVER-RIP" BRAND

**Tarpaulins**

The largest seller for construction work because—

they're **WATERPROOF**  
they're **MILDEWPROOF**  
they're **FIREPROOF**

NEVER-RIP has proved its superior durability under tough construction conditions in all parts of the world, and under all climatic conditions.

Insist on Never-Rip from your dealer; or order direct from

**Canvas Fabricators, Inc.**  
633 W. Fulton St., Chicago 6, Ill.



## County's Work Ranges From Roads to Rescues

(Continued from page 2)

outside assistance the office has needed has been in the making of aerial surveys. This work was done by Fairchild Aerial Surveys, Inc., of Long Island City.

At inland Yaphank, in the center of the county, the Department has a large-size maintenance shop where the testing laboratory is also located. At Shinnecock Canal, connecting Great Peconic Bay and Shinnecock Bay, the County also has a marine base for equipment used in maintaining the canal whose locks are operated by county forces. County equipment based at this point includes a derrick boat with a 38-foot boom and a 3/8-yard clamshell bucket operated by a Clyde hoisting engine, a tug, two deck scows, and a complete diver's gear. Because of this equipment the County is often called upon to do things which are remote from the normal concern of a highway organization.

Last winter, for instance, during a storm in Gardiners Bay a fishing boat rolled over and sank, drowning a man trapped in its cabin. The Coast Guard asked the County for help in getting the body, so the county diver went down and brought it up. Highway Superintendent Tuthill directed operations through the telephone communication system. Hardly a season passes without the Highway Department being called upon to grapple in some of the bays for the body of a drowned fisherman or clam digger. Also among the varied assignments delegated to the County Highway Department is the making of murder surveys for the District Attorney's office.

The County also maintains and operates four bascule bridges on county roads linking the main part of the island with the barrier reef along the south shore. One is located at Quogue, one at Hampton Bays, and two at Westhampton Beach. The same applies to a swing span and flood gates at Centerport on the north shore. Other activities include the operation of a bathing beach on Peconic Bay.

When the Federal government no longer had further use for a couple of

1,400-acre airports in Suffolk, it turned them over to the County. One of these, MacArthur Airport, is now being maintained by the Town of Islip. But the County expects to lease the other airport which is located at Westhampton.

County forces also design, construct, and maintain sanitation and water-supply facilities at some of these various installations. Other types of construction include waterways, harbors, breakwaters, jetties, and beach-erosion control.

### Highway Mileage

A total of 350 miles of county roads reach out into the hinterlands of Suffolk. Of these, 174 miles are maintained by county forces while the remaining 176 miles, known as town roads, are maintained by the townships. The county-maintained roads are broken down as follows:

Concrete	141 miles
Bituminous macadam	10 miles
Oiled dirt roads	21 miles
Stabilized dirt roads	2 miles
<b>Total</b>	<b>174 miles</b>

County roads usually have pavements 20 to 34 feet in width, and either connect state highways or else feed into them. Town roads, which now generally evolve from some real-estate development, are less heavily traveled, have narrower roadways, may or may not be paved, and are feeders to either state or county roads.

While the bulk of the present mileage is concrete, no more of this type is scheduled for construction at the present, as stated earlier. During the war the lack of labor and materials prevented adequate maintenance on these roads, and as a result many are in bad shape. On Roanoke Avenue in Riverhead, for example, a mile of concrete is being removed to make way for a soil-stabilized base course which will be given a bituminous surface. The concrete road will not be a total loss, however, as the broken rubble is to be used in some beach erosion-control work. The new construction by county forces will cost \$134,000.

The soil-stabilized base course which is being adopted by the County for all future roads consists of a minimum 6-inch layer of selected material, usually sand, gravel, and loam. These are blended together mechanically by graders, with water added to the optimum moisture content. After being well mixed on the road, the material is

spread in thin layers, not exceeding 3 inches, and compacted by smooth-wheel 10-ton rollers. This is the basic idea, but the course may be thickened to suit conditions.

A road of this design, constructed at Mattituck, successfully withstood the 1944 flood occurring right after it was completed. After three winters, no

shrinkage cracks or expansion heaves have developed, and the riding surface of cut-back asphalt with a sand cover is still in first-class shape. Variations on this design may introduce some bituminous material into the base as a binder. And a wearing surface of plant-mix is being considered since two com-

(Continued on next page)



**AT LAST... A PRACTICAL Automatic WEIGH BATCHER**

**NOW CONVEYCO** offers the finest development in automatic weigh batching — an Electronic Controlled Weigh Unit, which can be adapted to any weigh batching equipment. No complicated mechanisms. This Conveyco Unit is designed around standard electrical equipment, using a dial scale with single indicator and one photo electric cell.

Modernize your old outmoded Batchers, Ready Mix Plants or Asphalt Hot Plants with this new Conveyco Electronic Weight Control Unit. Write for information.

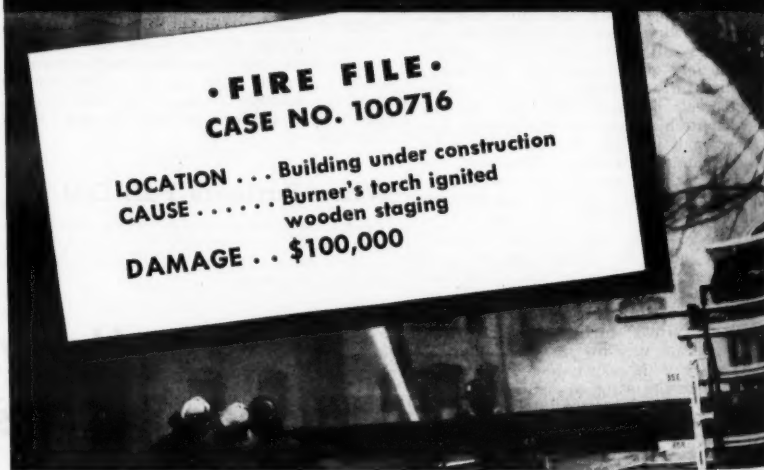


Investigate Conveyco Portable Batch Plants and Portable Bulk Cement Silos — also the Conveyco never-leak Cement Valve for Cement Hoppers and Bulk Cement Silos.

**THE CONVEYOR CO.**

ENGINEERS • MANUFACTURERS  
1280 EAST BRADSHAW AVENUE LOS ANGELES 11, CALIFORNIA

## The missing SAFETY FACTOR



### HOW MANY FIRES ARE STARTED BY INADEQUATE PROTECTION?

More than you can count on the fingers of both hands, many times over. And a large number could be avoided by flameproof

canvas. It is a simple precaution to take. Yet on many construction jobs it is the missing safety factor.

### FLAMEFOIL CANVAS PROTECTS CONSTRUCTION PROJECTS

It's true. Flamefoil Canvas only chars at the immediate point of contact with flame. It won't, it can't blaze. That is why Flamefoil Canvas affords dependable protection

against stray sparks from welding and burning work, hot rivets, lighted matches and cigarette butts. And the flameproofing does not wear off nor wash out.

### FLAMEFOIL CANVAS IS MILDEWPROOF, WATER AND WEATHER RESISTANT

Treated by a patented\* process, Flamefoil Canvas not only protects against costly loss and delay by fire, but can add months of wear to your canvas equipment. That's because it resists the deterior-

ating effects of rot, mildew, moisture and temperature changes. Use it for welding curtains, painter's and burner's drops, protective covering over construction machinery, equipment and materials.

### FLAMECOTE CANVAS FINISH PRESERVES ORDINARY CANVAS

Easily applied by brush or spray, Flamecote Canvas Finish prolongs the life of your ordinary canvas, makes it flameproof, mildewproof, resistant to water

and weather at the same time. The months of extra wear which result will more than pay for the low cost. See your canvas goods dealer or write us direct.

\*Manufactured under Patents Nos. 2,044,176 and 2,299,612. Others pending.



**FLAMEFOIL PRODUCTS**  
INCORPORATED  
PHILADELPHIA TEXTILE FINISHERS  
Makers of Flamefoil Canvas • Flamefoil Fabric • Flamefoil Brown and Flamecote Canvas Finish

## Two-Cylinder

# ONAN

## 10 H.P. 1 CYCLE "CK" ENGINE



A new, light, compact, easily-installed engine of wide power range. Completely "De Luxe" equipped, easy-to-get-at controls, and many other *plus* points. Prompt delivery on early orders.

**ONAN ELECTRIC PLANTS—A.C.—350 to 35,000 watts in standard voltages and frequencies; D.C.—600 to 10,000 watts, 115 and 230 volts. Battery chargers—500 to 6,000 watts, 6, 12, 24, 32 and 115 volts. ONAN AIR-COOLED ENGINES—CK: 2-cylinder opposed, 10 h.p.; BH: 2-cylinder opposed, 5.5 h.p.; 1B: 1-cylinder, 2.5 h.p.**

**WRITE FOR SPECIFICATIONS**

**D. W. ONAN & SONS INC.**  
3473 Royalston Ave. Minneapolis 5, Minn.

## ONAN 4-Cycle ENGINES

- **HEAVY-DUTY CONSTRUCTION:** Short, sturdy crankshaft. Extra-large bearings.
- **SMOOTH POWER:** Opposed 2-cylinder design. Fully counter-balanced crankshaft.
- **SUPER COOLING:** Axial-flow fan delivers 600 cu. ft. of cool air per minute. Larger fin area.
- **ALUMINUM CONSTRUCTION:** High-strength aluminum castings reduce weight.
- **ELECTRIC STARTING AVAILABLE:** Built-in electric push-button or automatic starting.
- **COMPACT, LIGHT WEIGHT:** Fits into 15 x 19 x 18 inch space. Weighs only 97 pounds.



## County's Work Ranges From Roads to Rescues

(Continued from preceding page)

mercial asphalt plants are available to the County.

### 1947 Program

In addition to the job at Riverhead, the Department is doing another stabilization job, 4 miles long, on Union Avenue in Islip. This is mostly on new location. A 50 to 66-foot right-of-way was acquired. On these projects the bituminous surface will be 30 feet wide flanked by 8 to 10-foot shoulders in the interests of safety. The shoulders are oiled, with one of the oil companies furnishing and applying the oil by arrangement with the County.

At Blue Point on the south shore a composite timber and concrete bridge with approach fills is under construction over Cory's Creek at a cost of \$100,000. A 3-mile stretch of Suffolk Boulevard running from Mastic to the Great South Bay is being graded and given an oil surface at a cost of \$40,000. On Seamans Avenue along Browns River in Sayville, 1/2 mile of new stabilized road is under way. It requires driving 1,200 feet of sheet piling along the bank of the river; also, excavating a large quantity of mud which will be replaced with sand pumped from the bay by a local hired dredge. The total cost will amount to around \$224,000. Near Bay Shore, a connection 0.8 mile long to the Southern State Parkway will be graded and surfaced. At Stony Brook a resurfacing job is scheduled to cost \$73,000.

Preliminary studies have also been made for a secondary road to be built under the Federal-Aid secondary-road program. It will run 15 miles from Commack on State Route 25 to a point just west of Patchogue on the Montauk Highway, State Route 27. It will have dual 25-foot pavements separated by a 30-foot mall. The design will be done by county forces, while the construction will be supervised by the State and Federal government. Like the other major county highways, this road will be landscaped, with the shoulders and slopes seeded, and on gentle gradients to avoid deep ditches. As this part of Long Island is good tulip-growing country, several beds of these flowers will be laid out in the central mall.

With the exception of the north shore, most of Suffolk County is flat land with a water table that is being lowered constantly by farmers tapping the ground water for irrigation purposes. So instead of draining the roads to tide water, every effort is made to conduct surface water back into the ground by recharging basins. When a new road is designed and constructed, provisions are made to include a drainage area into which storm water can be directed. Contour surveys are run to choose the best sump site, and then drainage areas are provided.

These may cover from 2 to 6 acres and are from 10 to 15 feet deep. Three of the large-size ones have already been excavated at Huntington, Amagansett, and Southold, and three others are now in the plan stage. The excavated material may be used for highway fills; if sand, it may also be used as a mat on top of a bituminous application, or to spread on icy roads in the winter.

Where the necessary space cannot be obtained for drainage areas—say along a narrow right-of-way—leaching basins take their place. These may be lengths of pipe with open joints wrapped in tar paper leading down into the ground, shafts of hollow concrete blocks, or just holes of any size filled with pervious gravel.

Other new work on the agenda are the plans and survey for a road, marginal and parallel to the Long Island

Railroad, running between Amityville, Lindenhurst, and Babylon.

### Snow Removal

This past winter the State turned over to the County the job of removing snow from both state and county highways. So in addition to the 174 miles of county roads, the Suffolk County Highway Department cleared 300 miles of state roads. The State reimbursed the County for the cost of this work.

The winter was fairly mild, especially along the south shore where the ocean tempers the climate. But on the north shore one storm brought 5 feet of snowdrifts along one of the highways. For snow removal the County has 14 plows: 11 high-speed plows which are put on trucks that can go 35 to 40 mph; 2 big straight-blade plows; and a V-type plow. Trucks are hired to carry the plows.

### Equipment

The Highway Department owns the following equipment which it augments

with rented units whenever necessary for any construction or maintenance operations:

- 6 Buick passenger cars
- 5 Chevrolet passenger cars
- 1 Willys jeep
- 1 Mack truck
- 3 Chevrolet trucks
- 1 Ford truck
- 2 motor graders, Galion and Austin-Western
- 1 International TD-9 tractor equipped with a Bucyrus-Erie loader
- 1 Haiss bucket loader
- 1 Galion 10-ton tandem roller
- 1 Galion portable roller

- 2 2-bag concrete mixers, Smith and Rex
- 2 Centaur mowers
- 1 10-ton trailer
- 2 Chrysler-powered 5-inch 250-gpm pumps
- 10 2 and 3-inch pumps
- 1 Ingersoll-Rand 110-cfm compressor
- 4 Ingersoll-Rand paving breakers
- 2 9-foot Good Roads Handy-Sandy sanders
- 9 Good Roads gravity-type 2S sanders

About 10 additional trucks are usually hired for general maintenance purposes. A Lorain truck crane is one piece of equipment on order which the

(Concluded on next page, Col. 4)

## J's DECALS

**FOR SMART IDENTIFICATION**

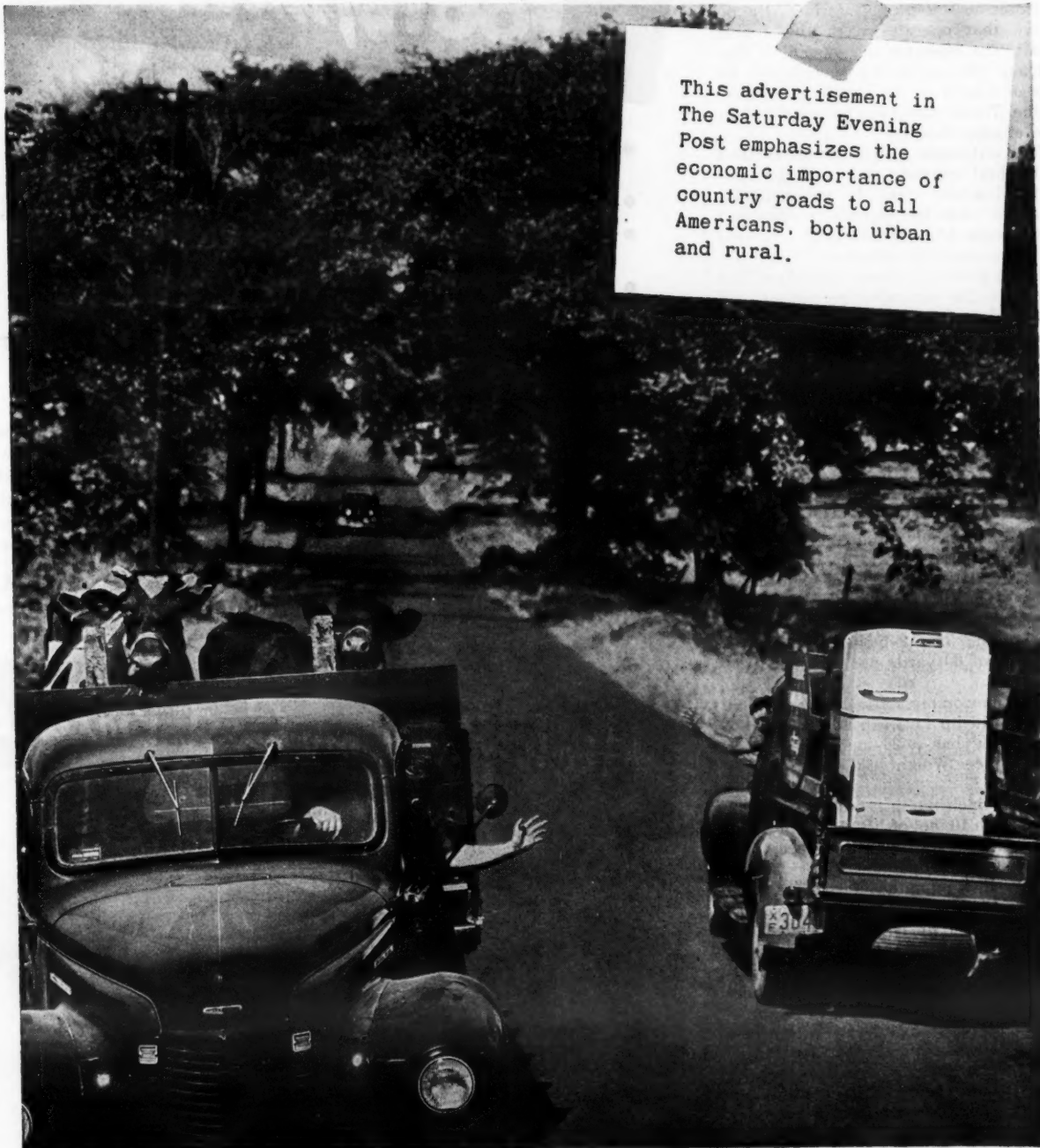
TRUCKS, EQUIPMENT, WINDOWS, EQUIPMENT, WINDOWS

FREE TECHNICAL AND DESIGNING SERVICE

**CONTINENTAL DECALCOMANIA CO.**

GRAND RAPIDS, MICHIGAN

**FARM-TO-MARKET ROADS** are two-way trade routes. They carry food to cities; manufactured goods to farms. Important to highway officials and engineers in the development of these vital roads is Barrett-Tarvia road tar, a dependable and economical all-purpose paving material.



This advertisement in The Saturday Evening Post emphasizes the economic importance of country roads to all Americans, both urban and rural.

**HOW BARRETT SERVES THE ROAD BUILDING INDUSTRY.** Barrett Tarvia® road tar and Tarvia-lithic® bituminous concrete, which have long been favored paving materials of road officials and engineers, meet almost every requirement for dependable, low-cost road construction, maintenance and repair. Barrett also makes Wood Preservatives for guard rails and bridges. Protective Coatings for culverts and underground pipe, and Waterproofing for viaducts and tunnels. These and other Barrett basic products establish Barrett as **ONE OF AMERICA'S GREAT BASIC BUSINESSES.**



**THE BARRETT DIVISION**  
ALLIED CHEMICAL & DYE CORPORATION  
40 Rector Street, New York 6, N. Y.

© Reg. U. S. Pat. Off.

**TIP TO ROAD MEN:** If any of the country roads in your territory need attention, ask the Barrett field man for suggestions. He can help you.





The new Lowther Model 100 C-Saw incorporates Rototrac self-propelling and an automatic mercury-type clutch among its features.

## Portable-Saw Line Has Added Features

New design features for its line of portable engine-driven saws are announced by the Harry A. Lowther Co., 141 W. Jackson Blvd., Chicago 4, Ill. The Rototrac self-propelling feature and an automatic mercury-type C-Saw clutch will be incorporated on the new Model 100 C-Saw.

Rototrac self-propelling is a friction drive that operates from the engine shaft. The operator can engage or disengage the propelling mechanism by use of a lever on the handle of the machine. Travel speed can be regulated by the engine throttle.

The automatic C-Saw clutch is filled with fluid mercury and is of the centrifugal-action type. It automatically engages when the throttle is open and disengages when the throttle is closed or if the saw blade pinches.

Other points mentioned in folder PR-31A are the aircraft-type wheel and axle and a screw adjustment of the engine-carriage base which controls belt tension.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 6.

## Sand, Gravel Pumps In Four Capacities

Sand and gravel pumps in 3, 6, 8, and 10-inch sizes are made by the Kansas City Hay Press Co., 801 Woodswether, Kansas City, Mo. The 10-inch pump has a capacity of 90 yards per hour or 3,000 gpm. The 8-inch pump has a capacity of 60 yards per hour or 1,800 gpm.

Power recommendation for the 8-inch pump is 16 hp for each 10 feet of lift. The pulley has a 20-inch diameter x 12-inch face. Weight of the unit is 5,500 pounds.

The 10-inch pump requires about 22 hp for each 10 feet of lift. Its pulley has a 28-inch diameter x 16-inch face. The unit weighs 6,000 pounds.

The 6-inch pump has a capacity of 35 cubic yards per hour; it will pump 1,000 gpm. About 7 hp is recommended for each 10 feet of lift. The pulley has a 20-inch diameter x 12-inch face. Weight of the unit is 1,800 pounds. The 3-inch pump weighs 300 pounds and requires about 3 hp for each 10 feet of lift. It has a 9-yard-per-hour capacity. Its pulley has a 6-inch diameter x 5-inch face.

The 3-inch pump will pass solids up to 1½ inches; the 6-inch, up to 4 inches; the 8-inch up to 5½ inches; and the 10-inch, up to 7½ inches.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 30.

## Concrete-Block Machine

A folder discussing its concrete-block-making machine has been issued by the Universal Concrete Machinery Co., 297 So. High St., Columbus 15,

Ohio. Photographs taken from four points of view are used to show the Vibro-Tamp machine's construction, controls for operation, and other fea-

tures. It is said to produce 300 blocks an hour, 8 x 8 x 16 inches. The mold box can be adjusted for various other sizes; molds are available for special sizes.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 57.

## Paste Welding Flux

A paste flux for gas welding of cast iron has been developed by the All-State Welding Alloys Co., Inc., 96 W. Post Road, White Plains, N. Y. Unlike powdered flux, the All-State No. 1A cast-iron flux is painted on the cast iron while the casting is cold. If desired, the rod can also be painted with the material to provide additional flux.

The flux is said to protect against surface oxidation, prevent porosity in the finished weld, and to be economical and easy to use.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 24.

## County Work

(Continued from preceding page)

County is anxious to secure soon.

### Personnel

Harry T. Tuthill is Suffolk County Superintendent of Highways, assisted by Al Cass, Construction Engineer, and Wayne Williamson, Maintenance Engineer, who is also in charge of the Yaphank shops. R. J. Reitano, Testing Engineer, is in charge of the materials and research work at the laboratory. Harrison Weber, assisted by Samuel Cross, is in charge of all waterways and erosion work. F. William Hunninghouse is Right-of-Way Engineer; Major H. Lee Dennison, Delineator; and Col. John K. Daly is Chief of Surveys.

Fire prevention is a year-round public responsibility. Last year more than 10,000 lives were lost and \$561,000,000 worth of property destroyed due to fires. Carelessness causes most fires; let's help prevent them.

## FOOTE Kinetic mixer

for profitable  
work on small  
asphalt jobs

Now it is possible to do all sorts of small asphalt jobs—at a profit—with the Foote Kinetic Mixer! You take the asphalt plant to the job... mix fast and thoroughly... get high asphalt output with a low equipment investment. For the first time, contractors with limited capital can share in the profitable jobs requiring quantities of asphalt that cannot be prepared economically in a regular plant. Write for details on the new Foote Kinetic Mixer—and the entirely new mixing principle that makes it possible.

Also see page 37



- Handles any cold mix—fast!
- Capacity 3 cubic feet!
- An entirely new mixing principle!
- Thoroughly coats every particle of aggregate in seconds!
- Fully portable—easy to handle!
- High output with low equipment investment!

### Builders of...

Adnan Black Top Pavers,  
MultiFoote Concrete Pavers  
and Foote Kinetic Mixers.

**THE FOOTE COMPANY, INC.**  
1916 State Street, Nunda, New York

## High $\frac{S}{W}$ = Low Cost Bridges

For small bridges and other drainage structures, the high strength-weight ( $\frac{S}{W}$ ) ratio of ARMCO MULTI PLATE means you get a faster, more economical job.

Deep corrugations provide ample designed strength with light weight. Handling and hauling costs go down. Installation is quick and easy—even for inexperienced crews. A simple

"twist-of-the-wrist" and the plates are bolted together to form a sturdy structure. No costly form work or special equipment is required. Backfilling is done directly against the metal and local materials may be used for finishing.

Use ARMCO MULTI PLATE as a time-saving, cost-cutting material for small bridges, culverts, stream enclosures,

sewers, conduits and similar structures. These may be in the form of pipe, arches or pipe-arches. Write for complete information. Armco Drainage & Metal Products, Inc., 865 Curtis Street, Middletown, Ohio.

**ARMCO  
MULTI PLATE**





# Consider Maintenance In Road-Project Plans

## AASHO Subcommittee Study Reveals Need for Greater Recognition of Maintenance Problems in Road Design

A VITAL problem in road building and maintenance was recently studied by Subcommittee 3 of the Maintenance and Equipment Committee of the American Association of State Highway Officials; the study findings were presented at the Association's annual meeting.

The problem was how to get road-maintenance problems recognized in the design stage of a project and during its construction. Failure to consider maintenance at the time a project is being planned has, in the past, led to unnecessarily high maintenance costs. Consideration of it at that time can often result in great economy.

Reports from 40 state highway departments were secured and studied. In only nine states does a maintenance engineer, along with the design and construction engineers, review plans in the field before their adoption; or go over construction jobs with construction engineers, before acceptance, to see if the work is satisfactory from a maintenance point of view. In sixteen states the district or division engineer who handles both construction and maintenance represents both construction and maintenance in the inspection with the design engineer. In ten states there is

no definite procedure for obtaining recognition of maintenance problems which could be corrected by changes in design.

One state reported a practice of filling the higher administrative construction positions with men who have had maintenance experience. This has proved very effective in assuring receptive consideration of maintenance problems which affect construction design.

Some of the methods used in various states to provide effective liaison between the construction and maintenance divisions are cited in this article.

### Connecticut's Method

The Connecticut State Highway Department is the only one with a staff member whose sole duty is to deal with the problems of design and construction as they affect maintenance. (See C. & E. M., Oct., 1944, page 83.) Known as the Construction Examiner for Maintenance, he examines all plans and makes recommendations. He pays particular attention to any apparent weaknesses or otherwise undesirable features which might cause added maintenance costs or necessitate changes after construction has been completed.

His investigation includes a careful study of all details of drainage structures and outlets with rights; stability of subgrades and slopes; cross slopes, especially with respect to snow removal and snow water, and stability of rock cut slopes; the relation of proposed im-

provements to existing improved property, driveways, etc.; safety features, guard rail vs. flat slopes; sections which might be abandoned to the towns; and all other features that would have a bearing on future maintenance.

When the final plans are made and sent to the various engineers for review, a set goes to this Construction Examiner. He checks it to see that the recommendations adopted are incorporated in the plans, and to make any other changes he considers necessary from the maintenance standpoint. After this review, no material change may be made in the plans by the design section without notifying the Director of Roadway Maintenance.

When a contract is nearly completed, the resident engineer notifies the Construction Examiner for Maintenance. He then visits the work with the resident engineer, notes any omissions or changes, and makes recommendations for any action the resident engineer is not empowered to take. Action is then taken on these recommendations at

headquarters.

In Montana, a somewhat similar procedure is adopted, although the plans are reviewed by the Maintenance Engineer himself. During the course of construction, he inspects the work from time to time and makes recommendations, if necessary, to the Construction and district engineers. He also reviews all work orders issued during construction. Agreement between the Construction and Maintenance Engineers on all construction changes is reached before they are presented for final approval.

When a job is completed, the Maintenance Engineer makes an inspection with the Construction and district engineers. The work must be satisfactory to all concerned before final acceptance.

### Work Through the Districts

Some fifteen states achieve recognition of maintenance problems through the district or division engineers. These states include Arizona, Idaho, Iowa, Kansas, Maryland, Nevada, New York,

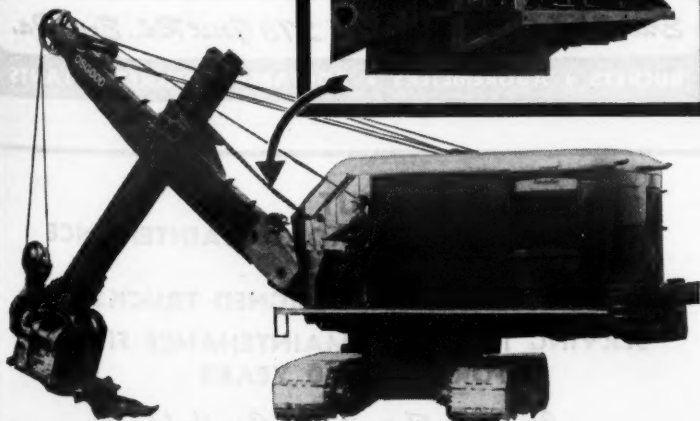
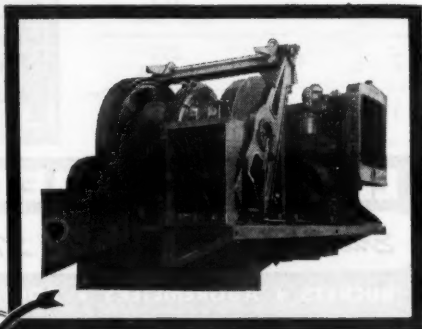
(Continued on next page)

## UNIT Cast Steel CONSTRUCTION for

- Maximum Strength
- Permanent Shaft Alignment
- More Efficient Arrangement of Machinery

The deck of an OSGOOD is a single, full length steel casting, acting also as support for the engine and counterweight. Unit cast steel construction assures a strong, solid base, free from vibration, that keeps shafts and other operating parts in perfect alignment. All operating machinery is mounted on this deck to provide maximum accessibility.

Plan now to choose an OSGOOD . . . designed for greater operating efficiency. A complete line of Power Shovels, Cranes, Draglines, Backhoes, Clamshells and Pile Drivers.



POWER SHOVELS • CRANES • DRAGLINES • CLAMSHELLS • BACKHOES • PILE DRIVERS •  
**THE OSGOOD CO. O-G THE GENERAL CO.**  
 EXCAVATOR  
 DIESEL, GASOLINE OR ELECTRIC POWERED • 1/4 TO 2 1/2 CU. YD. • CRAWLERS & MOBILCRANES



ESCO 2 1/4-yard all-cast dipper, with manganese steel dog leg bail working on 80D Northwest rock shovel. Location at Kortes Dam in Wyoming; Morrison-Knudsen Company is contractor.

## How to "SOFTEN UP" tough digging jobs!

The rock in the picture above tells the story of a typical job for ESCO dipper buckets. And repeat purchases of ESCO buckets by contractors all over the world tell the story of how well these buckets stand up to their job of "softening up" tough going.

Regardless of how tough the job may be, operators find that their ESCO buckets give them

- Maximum payloads
- Efficient, fast digging
- Long life on the job
- Minimum maintenance and loss of time

These advantages are built into ESCO buckets. Parts subject to wear and shock are made of

ESCO Manganese Steel which hardens and polishes with use while retaining all its rugged strength and shock resistance.

Practical excavating engineers design ESCO buckets. They place strength where it is needed, eliminate unnecessary weight, provide for clean, full bite and quick, complete discharge.

### Detailed Information Available

ESCO buckets are made in two types—the all-cast for extremely hard service, and the lighter cast-welded type for general purpose work. For your information, complete data on both buckets including materials used, construction details, sizes, etc., is available upon request. Fill in and mail the coupon below.

**ESCO** Manganese Steel  
FOR ULTIMATE ECONOMY

**ELECTRIC STEEL FOUNDRY**

2169 N. W. 25th AVENUE, PORTLAND 10, OREGON

### OFFICES

CHICAGO, ILLINOIS  
EUGENE, OREGON  
HONOLULU, T. H.  
LOS ANGELES, CALIF.

NEW YORK CITY, N.Y.  
SAN FRANCISCO, CALIF.  
SEATTLE, WASH.  
SPOKANE, WASH.

IN CANADA — ESCO LIMITED, VANCOUVER, B. C.

**ELECTRIC STEEL FOUNDRY**  
2169 N.W. 25th Avenue  
Portland 10, Oregon

Please send me complete data on  
☐ Escalator Cast Manganese Dipper.  
☐ Escalator Cast Welded Dipper.

Name \_\_\_\_\_

Address \_\_\_\_\_ Zone \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_



## Consider Maintenance In Road-Project Plans

(Continued from preceding page)

North Carolina, North Dakota, Oklahoma, Oregon, South Carolina, South Dakota, Virginia, and Washington. In all these states, the district engineer is in charge of both construction and maintenance within his district. He is therefore particularly concerned with the effect of design and construction on his maintenance problems. In many cases, however, he can only voice his opinion; there is no guarantee that his suggestions for design changes to reduce maintenance will be followed.

In Massachusetts, the preliminary report on a proposed construction project is reviewed in the field by the highway engineer, the project engineer, the construction engineer, and the maintenance engineer for the district before it is submitted to the main office. During this inspection, the district maintenance engineer has an opportunity to present his views on existing maintenance problems in that section, and also his opinion on the effects of the proposed lines and grades on future maintenance. Considerable thought is being given in this state to incorporating preventive maintenance into design features.

### The Conference Method

In California, when plans for a new project are received at headquarters, the maintenance department is given the opportunity to approve the alignment, section, and type of surfacing proposed. T. H. Dennis, Maintenance Engineer of the California Division of Highways, stated:

"I believe that there is a great advantage to the maintenance department in a liaison between construction and maintenance on design features of construction. The maintenance man, through years of experience, has a different point of view from the construction man and sees items that the construction man may overlook on the job. This is particularly true in the matter of drainage features, stability of cut and fill slopes, driveways, guard rails, clean-up items, and roadside features, which may tend to make maintenance costs higher than they should be. . . ."

Variations on this conference method, formal or informal, are followed also by Florida, Illinois, Indiana, Maine, Mississippi, Missouri, Vermont, and Wisconsin.

### Other Procedures

In Ohio, the functions of design and maintenance are closely integrated. In the central office, the Chief Engineer sees to it that necessary liaison is obtained. In the field, the twelve district offices see to it. In both the central office and field, maintenance is brought into the picture early in the idea stage of the project. A maintenance representative is a member of the committee which approves the need for projects. Detailed review of individual plans by maintenance representatives has been required for a number of years, but it is reported that lack of time and personnel has forced the procedure into a more or less perfunctory routine. The real and effective liaison between maintenance and design is established in the central office, where a free exchange of ideas has been found beneficial by both divisions.

Iowa combines the conference method with supervision through the district offices. At the weekly staff conferences, excessive maintenance and corrective measures reported to the Maintenance Engineer by the districts are brought up for discussion, and recommendations for solving these problems can be incorporated in future plans. In this state,

the district engineers are in charge of both construction and maintenance. They have an opportunity to recommend changes in design before work starts, but their opinions are not necessarily influential on the design finally adopted.

West Virginia follows a similar combined procedure. Construction and Maintenance Engineers work together in recommending projects for the construction and reconstruction program. Then plans are checked in the field by the district engineers.

In a few states, construction and maintenance are combined under one head. There, of course, the engineer responsible for both these activities is constantly aware of both sides of the question.

### More Cooperation Needed

It was the general consensus that greater effort is needed to modify construction design with a view to more efficient and economical maintenance. The means suggested for achieving this cooperation are two. One is to have the district maintenance men send in corrective design suggestions from time to time. These suggestions would be based on specific defects which have developed after construction is completed. They would be considered at headquarters staff meetings, and would influence future design and project plans.

Among the states reporting such procedure was Idaho. This State keeps two sets of detailed records on every construction project. One reports periodic inspections of base, surface, performance, etc. The other records all maintenance, betterment, or reconstruction necessary. A study of these records provides a valuable guide to changes in design and construction for the future.

The other means is to have a maintenance engineer review tentative plans for every construction project, with the design and construction engineers, on a field survey before plans are finally adopted, and to have him make specific necessary recommendations at that time. Checking by maintenance engineers after completion of the contract would naturally follow.

Obviously, a combination of these two methods appears to be the ideal. The first should contribute to constant improvement in design; the second should insure minimum maintenance costs on each individual project. With the rising costs of highway work eating into our available highway funds, more thought must be given to keeping maintenance expenditures at a minimum.

### Committee Members

Subcommittee 3 making this study was headed by A. L. Donnelly, Director of Roadway Maintenance of the Connecticut State Highway Department. Other members included T. H. Dennis, Maintenance Engineer of the California Division of Highways; J. J. Forrer, Virginia Maintenance Engineer; J. E. Lawrence, Maintenance Engineer in Massachusetts; J. H. Marshall, Wash-

(Concluded on next page, Col. 3)



The new Ateco hydraulic scraper for wheeled tractors comes in three sizes: 4.5, 5.6, and 6.9 heaped yards. A special hitch assembly enables the pulling tractor to carry part of the scraper load.

### Hydraulic Scrapers For Wheel Tractors

A two-wheel hydraulic scraper for high-speed use with large wheel tractors is now being manufactured by the American Tractor Equipment Corp., 9131 San Leandro Blvd., Oakland 3, Calif. It comes in three sizes: H52, 4.5 heaped yards; H62, 5.6 heaped yards; and H72, 6.9 heaped yards. It is made for International I-9, Oliver 900, and other heavy-duty wheel tractors.

Features claimed for the Ateco scrapers are low center of gravity, independent front apron, and a rear apron that wipes the scraper bowl sides clean as the load is dumped. A special hitch assembly eliminates the front trucks of the scraper and enables the pulling tractor to carry part of the scraper load.

Cutting-edge width for the H52 is 6 feet 4 inches; for the H62, 7 feet; and

for the H72, 8 feet 6 inches. Weight of the H52 is 5,680 pounds; the H62 is 6,540 pounds; and the H72 is 8,490 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 11.

### Blocks, Sheaves Catalogs

A line of blocks and sheaves is described in broadsides issued by the Johnson Block Co., 320 W. 1st St., Tulsa 3, Okla. The line includes single and double sheaves, snatch blocks, open or closed and with swivel shackles, tongue blocks, and pulleys.

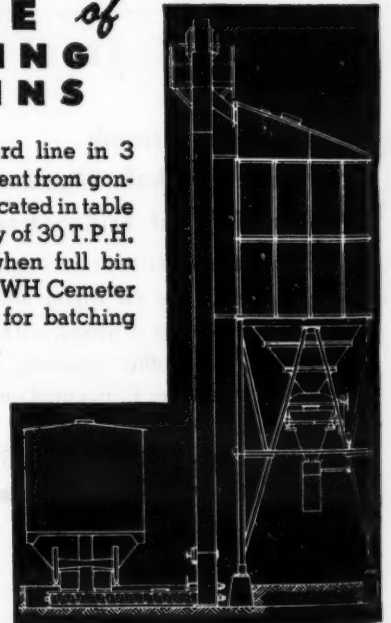
The broadsides list diameters, weights, working loads, sizes of wire or manila rope handled, and prices. Construction features are described and parts listed.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 54.

## A NEW LINE of CAR LOADING CEMENT BINS

WE have developed this standard line in 3 popular sizes for hauling bulk cement from gondola cars to bin. Capacities are indicated in table below. Bucket elevator has capacity of 30 T.P.H. High level bin signal indicates when full bin capacity has been reached. Type DWH Cemetery provides 8 to 20 cu. ft. capacity for batching service. Write for complete data.

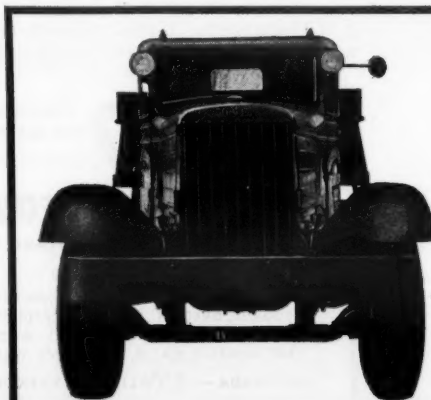
BIN	CAPACITY	
	CU. YDS.	BBLS
1	29	172 to 194
2	45	270 to 304
3	73	437 to 492



## ERIE AGGREGATE PLANTS

Erie Steel Construction Co., 278 Gelst Rd., Erie, Pa.

BUCKETS • AGGREGATES • PORTABLE CONCRETE PLANTS

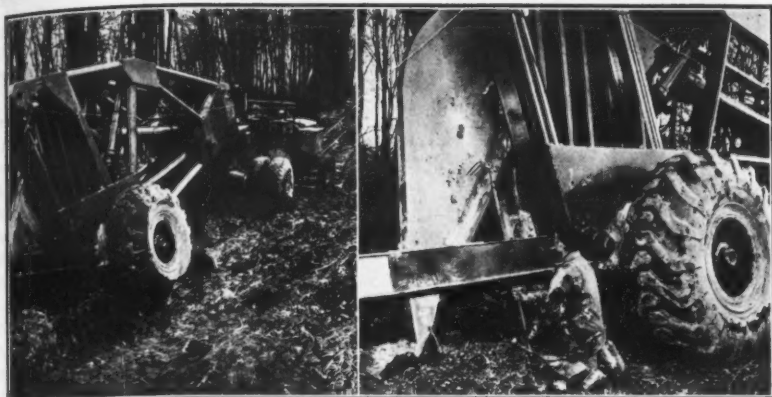


**CUT  
CONSTRUCTION AND ROAD MAINTENANCE  
COSTS  
WITH ESPECIALLY DESIGNED TRUCKS  
SERVING THE ROAD MAINTENANCE FIELD  
FOR OVER 40 YEARS**

*Limited Territory Available*

**Duplex Truck Company  
Lansing Michigan**





In a single operation, this 27-ton plow drills a 5-foot slot in the earth and lays a telephone cable between Washington and Baltimore. Goodyear tires supply flotation for the operation. The plow is pulled by three tractors; a trailer carries the cable reel.

### Trench Cut, Cable Laid by 27-Ton Plow

A 27-ton plow which can cut a slot in the earth 5 feet deep and lay a cable at the same time was recently used to install a telephone line between Baltimore and Washington. The plow is built on a pneumatic-tired chassis and was pulled by three 20-ton Caterpillar crawler tractors, whose total pulling power equaled 375 hp.

A trailer was used to carry the cable which is fed into the ground through an eyelet in the plowshare. Hydraulic mechanism moves the plowshare up and down to the desired depth, and also swings it back and forth to attain the desired angle for slicing.

Tires on the plowshare were manufactured by The Goodyear Tire & Rubber Co., Akron, Ohio. Two Sure Grips, size 21.00-28, were mounted directly at the blade, while four 14.00-24 All-Weather tires were used on the front wheels.

### Mechanical Pencil Writes in 6 Colors

A mechanical pencil with six different colored leads has been developed by the Ross-Frederick Corp., Box 429, Mineola, N. Y. Leads are red, blue, yellow, green, hard black, and soft black. No larger than the usual mechanical pencil, it is suited to the requirements of engineers, draftsmen, checkers, and others needing a variety of colored leads in their work.

A three-section metal chuck is said to hold the lead in writing position and to prevent slippage. Leads are selected by adjusting the metal clip which also serves to hold the pencil in the pocket. Small selection of leads is afforded by small colored dots imbedded in the barrel.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 13.

### Terracer Described

An announcement describing its Model No. 1 Terracer is free upon request to the Stockland Road Machinery Co., 2653 34th Ave., So., Minneapolis 6, Minn. The blade-type Terracer or grader is designed for use with wheel tractors. It can be used for terracing, ditching, land leveling, and other operations which involve movement of earth for short distances. It has full-circle blade adjustment and is available in 6, 7, 8, or 10-foot moldboard lengths.

The announcement lists specifications and describes the various features of the Terracer.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 67.

### Grinders and Accessories

A line of grinders and hardware specialties is described in bulletins issued by the Luther Grinder & Tool Co., Sheboygan, Wis. The line includes hand

grinders, power grinders, abrasive files and stones, wire wheel brushes, etc. The complete line is described, sizes and models are listed, and specifications are given. A price list is included with the bulletin.

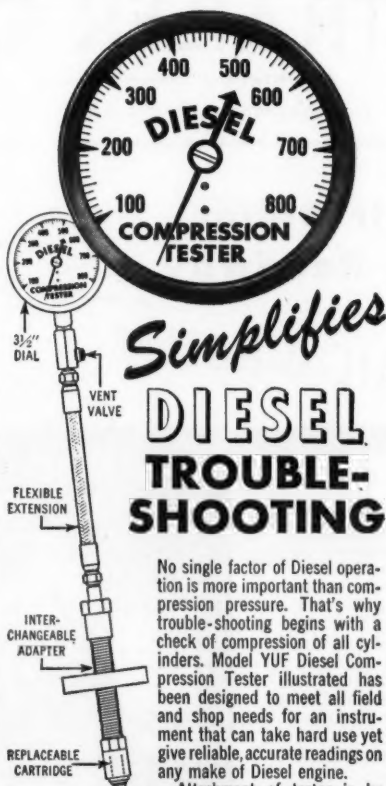
Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 96.

### Paint-Sprayer Units

Paint-spraying equipment and accessories are made by the Sharpe Mfg. Co., 1224 Wall St., Los Angeles 15, Calif. The line includes compressors, spray guns, extension guns, air-pressure gages and regulators, air-conditioning filters, finishing units, respirators, fabricated helmets, goggles and shields, and other equipment.

Capacities of the portable compressors range from the Model 1-N which has a displacement of 3 cubic feet and is powered by a 1/3-hp motor, to the GA-230 which has a displacement of 26.5 cubic feet and is powered by a 6-hp engine. Spray guns in many sizes and styles are available. They include these types: standard, internal atomizing, suction, pressure cup, and combined suction and pressure cup.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 26.



**Simplifies DIESEL TROUBLE-SHOOTING**

No single factor of Diesel operation is more important than compression pressure. That's why trouble-shooting begins with a check of compression of all cylinders. Model YUF Diesel Compression Tester illustrated has been designed to meet all field and shop needs for an instrument that can take hard use yet give reliable, accurate readings on any make of Diesel engine.

Attachment of tester is by means of interchangeable adapter which takes place of fuel injector. In addition to a "universal adapter" which serves more than 50 makes and types of Diesels, we have a complete line of special adapters for practically every commonly-used Diesel engine. Write for a copy of descriptive Leaflet 605.

**ATTENTION! Distributors:** Diesel equipment and accessory jobbers are invited to write for information about attractive distribution proposition.

**BACHARACH INDUSTRIAL INSTRUMENT CO.**  
7000 BENNETT STREET, PITTSBURGH 8, PA.

### Consider Maintenance In Road-Project Plans

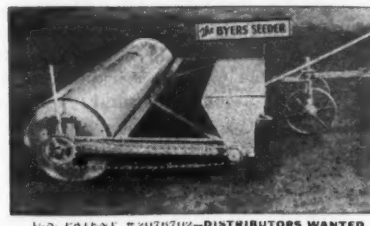
(Continued from preceding page)

ington Maintenance Engineer; H. D. Metcalf, Director of Maintenance and Equipment in Kentucky; C. L. Motl, Minnesota Maintenance Engineer; V. L. Ostrander, Superintendent of Operation and Maintenance, New York State; G.

W. Phillips, Alabama State Maintenance Engineer; C. W. Ross, Illinois Engineer of Maintenance; D. N. Stewart, Superintendent of Maintenance for Colorado; and E. L. Worthington, Commissioner and former Maintenance Engineer in West Virginia.

Regular investment in U.S. Savings Bonds insures your future and that of the nation. Own a share in America.

### THE BYERS SEEDER



Seeds, Rakes and Rolls in One Operation.

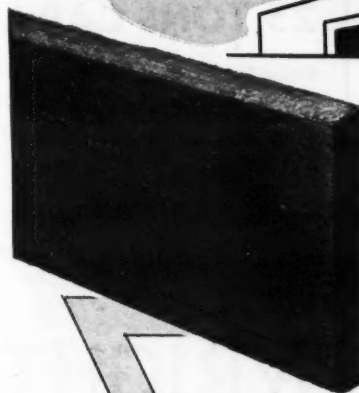
It will sow grass seed, commercial fertilizer, limestone or any granular material that can be broadcast on the surface of the ground and raked in.

**P. L. BYERS**

Clyde Ohio

**NOW**

*Available in Quantity*



**Keystone**

**FIBRE EXPANSION**

**JOINTS**

Through the completion of a new fibre joint plant, Keystone is now in a position to accept and ship orders of Fibre Expansion Joint. Keystone Fibre Expansion Joint meets all State specifications and is used in all types of concrete construction, such as, highways, airport run-ways, sidewalks, driveways, or large industrial floor areas. Keystone (non-extruding) Fibre Expansion Joint is light in weight, easy to handle under all weather conditions and never becomes sticky or tacky in summer or hard and brittle in the winter. All Keystone Fibre Expansion Joints have been properly treated and cured for best possible workability and durability. Assure yourself of carload rates by making up a full car from Keystone's complete line of paving products—all shipped from just one source.

### ARCHITECTS AND BUILDING CONTRACTORS

Keystone's Engineering and Research departments are always ready to help you with recommendations as to how these products can be used in your construction or building projects. Write for information or contact your local Keystone dealer.



**KEYSTONE ASPHALT PRODUCTS COMPANY**

A Division of the American Marietta Company 43 E. Ohio Street, CHICAGO 11, ILLINOIS



# Dual Concrete Road Has Safety Features

**Mall to Divide Traffic,  
Cross-Overs, and Parking  
Bays Included in Project  
To Improve Main Route**

♦ ANOTHER section of dual concrete highway has replaced the narrow 20-foot pavement for 2.6 miles along the Old Spanish Trail, U. S. 90, which borders the Gulf of Mexico between Gulfport and Long Beach, Miss. This newly completed stretch of scenic road was designed and constructed with careful attention to safety and beauty as well as to durability.

Solid construction is embodied in the 9-7-9-inch reinforced-concrete pavement laid on a compacted-sand base. The interests of safety are furthered by separating the two 25-foot traffic lanes by a mall from 8 to 60 feet in width. Also at about 500-foot intervals along the beach side of the south lane, concrete-paved parking bays adjoin the highway. These give motorists a place to pull off the road while enjoying the view, and buses a place to receive and discharge passengers without blocking traffic. They range from 80 to 300 feet in length, and are from 8 to 25 feet wide.

As this section of road is in the heart of a popular coastal resort center, concrete cross-overs connecting the two lanes of traffic have been constructed, also about 500 feet apart—another convenience and safety feature.

The Mississippi State Highway Department awarded a contract for the work to Stevens Brothers & Miller-Hutchinson Co. of New Orleans, La., on its low bid of \$514,014. Grading operations began last September; the project will be completed this summer.

## Grading in Sand

Located along the shimmering waters of the Gulf, this section of highway is protected by a concrete step sea wall which extends 25 miles from Biloxi to Bay St. Louis. The reconstruction contract lies wholly in Harrison County and extends westward from Woodward Avenue in West Gulfport to Girard Avenue in Long Beach. Grading for the new south lane which now carries east-bound traffic got under way first; traffic was carried as usual on the 20-foot old road located slightly to the north.

When the sea wall had been built, tons of sand from the Gulf had been pumped behind it, and the area planted to some degree with native shrubs and pine trees. Wherever these trees did not interfere with actual construction they were left standing for the sake of the roadside's appearance. The others were knocked over by bulldozers and burned.

Much excess sand was removed from the area behind the sea wall by first gathering it in stockpiles and then cast-

ing it over the wall onto the beach. The beach can stand some building up in this vicinity, as the prevailing southeast winds and current have all but washed it away from in front of the sea wall.

Stockpiles of sand were built up by two scrapers: a LeTourneau 8-yard unit pulled by an Allis-Chalmers HD-10 tractor, and a Continental 5-yard model pulled by an Allis-Chalmers WK tractor. Two tractor-dozers, a Caterpillar D8 and RD7, removed the trees, helped to load the scrapers, and assisted in stockpiling sand. A Koehring 502 dragline with a 55-foot boom and a Page 1½-yard bucket cast the sand over the wall.

The sandy areas in the center mall between the lanes, and from the paving



C. & E. M. Photo

A 3,000-pound drop hammer works in 12-foot leads mounted on a Ford truck to break up old pavement on the north lane of U. S. 90 in Mississippi.

out to the sea wall, were covered with a 3-inch blanket of red clay and 2 inches of topsoil. The clay was used

primarily to keep the sand from blowing away, while the topsoil with fertilizer incorporated into it provided a bed for the planting of Bermuda grass.

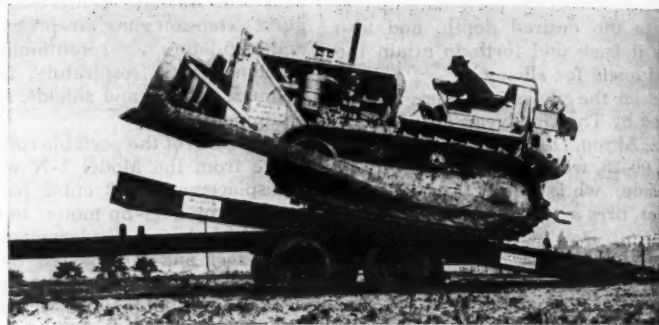
A borrow pit 8 miles away supplied the red clay selected material. It was dug out by a Lorain 40 dragline equipped with a 35-foot boom and a Yaun ¾-yard bucket. An average of 300 cubic yards per 9-hour day was hauled from the pit by a fleet of twelve 4-yard trucks which were hired and paid for on a yard-mile basis. The topsoil was obtained from a field close to the clay pit. After being dumped at the site, the material was spread by an Allis-Chalmers HD-7 tractor-doezer equipped with a Baker blade. It was leveled to grade by a Caterpillar No. 12 motor grader. The average distance between the sea wall and the edge of the paving is 25 feet.

By the middle of November grading was completed on the south lane so that paving could begin. The first slab was (Continued on next page)



## The New TRANSALL TILT-O-LOAD TRAILER 25 TONS CAPACITY

Specifically designed for the transportation of heavy equipment, the TRANSALL TILT-O-LOAD trailer offers the speed of tilt-deck loading with the addition of the revolutionary Wright Rubber-Ride assembly.



LOADING D-8 TRACTOR

Detailed information and literature will be mailed on request. Write today for Bulletin W-25.

"Your Smartest Move Yet"

# WRIGHT TRAILER COMPANY

117 EAST COLORADO ST.

Manufacturers of Commercial Trailers

Telephone Sycamore 6-8726

PASADENA 1, CALIF.

## Make Your Repair Dollar Cover More Roadway

### with LITTLEFORD TRAIL-O-ROLLER

This Littleford No. 155 Trail-O-Roller covers ground like a kid in a baby walker! It makes your dollar do a bigger job because whatever it rolls is there to stay. Gets to more jobs because it trails safely at any speed. Patented Hydraulic lift converts it easily from rolling to trailing position. Powered by air-cooled engine; has automotive type steering control, heavy duty transmission, machine finished cast main roller. Use Trail-O-Roller for all patch work, shoulder widening, alley paving, airport runways, driveways, parking areas, school yards...everything! Write for Bulletin No. 3 today.



## TECO ROAD SPREADER

Easily attached to any dump truck with chain and clips. Gives even distribution of stone, gravel, slag, chips or sand up to 10 feet wide. Spreads any thickness up to 5 inches. No revolving parts and nothing to get out of order. Flow of material is regulated by operator from steel platform at side of spreader. Write for folder and full details.

TONAWANDA ENGINEERING COMPANY  
20 Tonawanda St., Tonawanda, N. Y.



LITTLEFORD

LITTLEFORD BROS., Inc.

485 E. PEARL ST.,

CINCINNATI 2, OHIO



# Concrete Road

(Continued from preceding page)

poured on November 19 and the 25-foot road was completed on January 3, 1947. Both directions of traffic were then diverted to the new concrete, and the contractor proceeded to tear out the old pavement and prepare the subgrade for pouring the north lane which carries westbound traffic.

About 25 years ago the Old Spanish Trail was unpaved, having only a base of shell, clay, and gravel. This was later replaced with a concrete pavement, 5 inches thick and 20 feet wide. And that was subsequently surfaced with 2 inches of asphalt and flanked by a 6-inch concrete header on each side. A 2-foot widening of surface treatment was afterwards added to one side, together with a new curb and gutter. This old pavement was now cracked and shattered by two paving breakers mounted on Ford and Chevrolet trucks. A 3,000-pound drop hammer, moving in 12-foot cast-iron leads placed at the rear of the trucks, dropped 10 feet to the ground, and was then raised again by a hoist on the truck. The hoisting winch was driven by a Buda gas engine.

Next the rubble was dozed by the RD7 tractor into a windrow 10 to 12 feet wide and a few feet high. From that it was loaded into trucks by a Koehring 502 shovel with a 1 1/4-yard bucket. Most of the material was hauled away by the Port Commission of the City of Gulfport.

Paving on the north lane got under way on February 20 and was completed by the first part of May. The entire area from the sea wall to the north right-of-way line that was not taken



C. & E. M. Photo

An Allis-Chalmers tractor works with a Caterpillar No. 12 motor grader at the end of a cable. They are grading heavy beach sand in the center strip between the newly completed south concrete lane on U. S. 90 and the old pavement on the north.

up with paving was planted with Bermuda grass and clover. This part of the work was done during March and April.

## Concrete Preliminaries

The concrete batch plant was set up on a siding of the Louisville & Nashville railroad in Long Beach, about 1/4 mile from the west end of the job. Sand was obtained from the Gulfport Sand & Gravel Co. at Wolf River, Miss., about 15 miles away, and delivered to the plant in trucks. The American Sand & Gravel Co., Inc., at Hattiesburg, Miss., supplied the gravel; it shipped it in gondola cars via the Illinois Central railroad to Gulfport, and then over the L & N to the plant siding. There it was unloaded and stockpiled by a Koehring 301 crane with a 47-foot boom and a Blaw-Knox 1-yard clamshell bucket. This unit also kept full the Blaw-Knox 120-ton 2-compartment aggregate bin from the piles of sand and gravel on either side. Batch trucks backed under the bin to receive their loads which were weighed out on a Fairbanks-Morse beam scale.

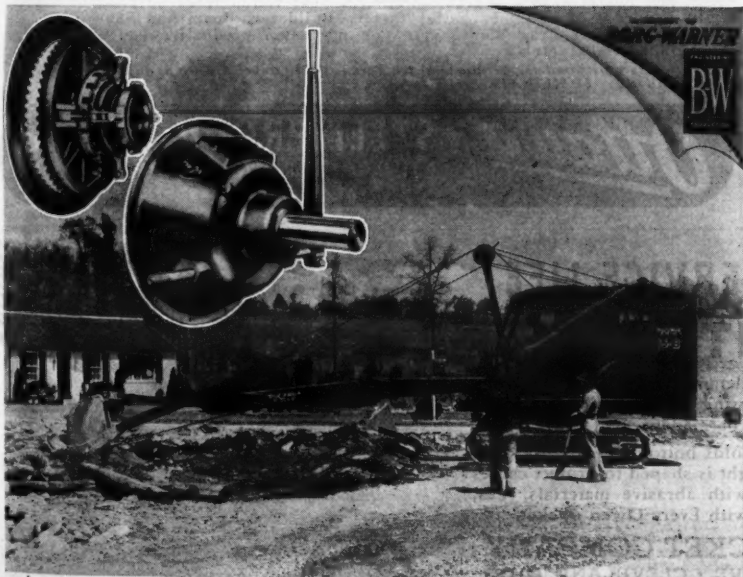
trough between the tracks. An enclosed elevator raised the cement to the bin.

Before the war the WPA had been engaged in road building along the Gulf Coast, and a large stockpile of wire-mesh reinforcing had been accumulated. The Mississippi State Highway Department turned this over to the contractor for use in the new road. Exposed to the elements for the past six years, the steel had become encrusted with scale and rust. This had to be removed before the steel could be used.

Accordingly the contractor set up near the batch plant a long steel table on which two 14-foot-long rollers were erected. Offset slightly, the two rollers held 228 brushes. These had 8-inch steel-wire bristles which pressed against each other as the rollers were revolved in opposite directions. A Ford V8 engine furnished the motive power. Four men inserted the mesh into one side of the rollers and then pulled it through as the wire brushes removed the rust and scale.

(Concluded on next page)

# ROCKFORD



## POWER TAKE-OFFS

### SELF CONTAINED UNIT

### WIDE RANGE OF SIZES

### CONSERVATIVE RATING

### ROLLER BEARINGS

### FINE ADJUSTMENT

### ACCURATE BALANCE

### S.A.E. DIMENSIONS

\* The housing supports the drive shaft, which is mounted on a main bearing in the housing and a pilot bearing in the engine flywheel. The heavy-duty clutch is mounted on the drive shaft, which is extended to serve as the output shaft for the external drive, and may carry a pulley, gear, sprocket, or drive through a coupling.

### Send for This Handy Bulletin

Shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications.



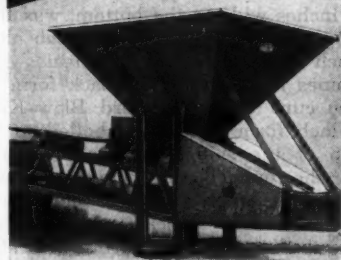
## ROCKFORD CLUTCH DIVISION

314 Catherine Street, Rockford, Illinois, U.S.A.

BORG-WARNER

# "Cemco" SECTIONAL CONVEYOR

FOR ONE MAN OPERATION



Shovel hoppers of two yard capacity can be quickly and easily installed.



## Adaptable FOR NEW USES at NEW LOCATIONS

A heavy duty conveyor, the Cemco will readily handle rock, sand, gravel, coal, lime, and ore. Available in both portable and stationary units, a combination of sections may be added to the head and tail to make up a desired length. Your choice of 18", 24", 30" widths.

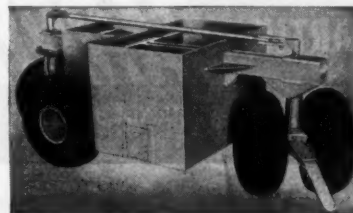
Perfectly balanced, the towing end can be easily raised and attached by one man. Standard pneumatic tires cushion the ride and make towing easy for a small truck.

Other features include: Hydraulic lifting system which is built into the A frame of the conveyor . . . 1-15/16" diameter jack shaft driven by an enclosed roller chain . . . triple braced lattice type frame . . . extra heavy troughing rolls . . . self-cleaning tail pulley . . . anti-friction pillow block and troughing roll bearings.

See Your Dealer or Write For Literature

### AIRPLANE-TIRED ROAD ROLLER

The Cemco Flat-Iron Roller's five pneumatic tires provide a compaction path of 72" to 75". Its low center of gravity permits work on shoulders and otherwise inaccessible places, even when loaded with 128 cu. ft. of sand. It smooths as it packs.



CONSTRUCTION EQUIPMENT and MANUFACTURING CO.

2430 University Avenue St. Paul 4, Minn.

ALSO MANUFACTURERS OF CEMCO HEAVY DUTY AGGREGATE BINS





C. &amp; E. M. Photo

Stevens Brothers & Miller-Hutchinson Co. set up this Blaw-Knox 120-ton two-compartment aggregate bin at the concrete plant. A Chevrolet truck backs under the bin to receive its load.

## Concrete Road

(Continued from preceding page)

### Laying the Pavement

Paving in the parking bays is 6 inches thick, while the dual lanes are 9-7-9 inches in thickness. The contractor had on the job about 2,000 linear feet of Blaw-Knox road forms, 9 inches high with a 10-inch base; all of this footage was set before making a pour. This quantity of forms was sufficient, as the average daily production of full 25-foot-width paving was around 750 feet.

After the forms were set by hand, a Cleveland subgrader was rolled along on top of them, towed by an Allis-Chalmers WK-35 tractor. The blades on the machine were carefully adjusted to allow for the 3½-inch center crown in the pavement. This somewhat-high crown is necessary to get the rain to run off rapidly, as the center-line profile of the road is practically flat in this area.

At it was impossible to roll the fine sea sand which is the sub-base of the new highway, compaction was achieved by keeping the sand thoroughly wet in front of the paving operations. Water was pumped from the Gulf by a Gorman-Rupp 4-inch pump through 300 feet of fire hose to soak the area between the forms. As the paver worked between the forms also, steel-mesh landing strips, used by the Army in the war on sandy airfields or on the beaches, were laid down. These gave the batch trucks a footing as they backed up to the paver. Batches, two to a truck, were hauled in a fleet of 20 to 22 Fords owned by O. D. Dabbs of Gulfport, Miss.

As the Koehring 34-E dual-drum paver advanced between the forms, it pulled along behind it a Ted Carr subgrade planer to make any necessary adjustments to the grade, and also a Cleveland scratch template as a final check on the work. Joints were then set immediately ahead of the concrete.

The expansion joints, on 105-foot centers, consist of Philip Carey asphalt-

impregnated fiber material, 1 inch thick, cut to the crown of the pavement. These joints are supported on dowel assemblies made by the Connors Steel Co. of Birmingham, Ala., and carrying 1-inch-round x 16-inch-long dowels on 18-inch centers across the pavement. No dowels are used at the contraction joints which are set on 35-foot centers between the expansion joints.

### Concrete Finishing

Water for the concrete was tapped from city hydrants located at regular intervals along the highway. It was conducted to the paver through a 1½-inch hose line. The batches were mixed 23 and 47 seconds respectively in each of the two drums, or a total mixing time of 1 minute and 10 seconds. Then they were dumped on the grade at any desired spot from the bucket traveling along the 35-foot boom.

A Jaeger-Lakewood double-screed finisher then struck off the concrete on a plane 2 inches below the tops of the forms. The reinforcing mesh was laid in place and more concrete was added after the finisher had backed up. To that 8-bag batch of concrete, 16-pounds (2 pounds to the sack of cement) of emulsified carbon black were added to darken the upper 2 inches of concrete in the paving. This was done to remove the glare from too-white pavement.

The transverse finisher was followed by a Koehring Longitudinal Finisher behind which came a Cleveland 14-foot-long bridge. From this bridge finishers inserted the flat steel strips to form the transverse contraction joints, and the longitudinal joint along the center line of the road. For the transverse joints two pieces were used, ½ inch wide x 2 inches deep x 12½ feet long, while the center strips were ¼ inch x 2 inches x 10 feet long.

An integral curb, 6 inches high and 6 inches wide at the bottom, was then poured monolithic with the slab along each side after the two finishing machines had passed. The back form for the curb was a standard Blaw-Knox 6-inch form which was bolted to the top of the slab form. Special forms for the rounded curb facing were made up by the American Sheet Metal Works, Inc., of New Orleans. They were clamped to the back forms with steel spacers leaving a 2-inch opening at the top; through this the concrete was shoveled to fill up the forms.

As the curbs were being constructed, finishers with Heltzel 10-foot-long steel straight-edges checked the surface of the concrete slabs for any low spots. Then they pulled a length of 1-inch hose over the top to remove any laitance or small marks left by the straight-edges. The joints were edged with a ½-inch-radius tool as the steel strips were removed. And the concrete was given a final finish with a light burlap drag, about 6 inches wide, made of three thicknesses of fabric. The curb face forms were removed after about an hour when the concrete had attained an initial set, but the back forms were left on for 24 hours. Then they were removed along with the slab forms and moved ahead for the next pour.

As soon as the concrete had set up, Sisalkraft paper in 26 x 60-foot blankets was spread out over the slab to prevent the moisture from leaving the concrete, thus curing it. Runner strips, 18 inches

wide, were placed over the front and back faces of the curbs. Sand was scattered over the paper to hold it in place for 72 hours.

### Quantities and Personnel

The major items included:

Removing old pavement	29,899 sq. yd.
Excavation	64,958 cu. yd.
Concrete pavement, 9-7-9-inch	77,307 sq. yd.
Concrete pavement, 6-inch	10,062 sq. yd.
Concrete integral cycloid curb	52,865 lin. ft.
Topsoil	8,048 cu. yd.
Selected material, red clay	12,073 cu. yd.
Seeding	30 acres
Springing	144,876 sq. yd.

Stevens Brothers & Miller-Hutchinson Co. employed an average force of 100 men under the direction of A. B. Aiken, Superintendent. For the Mississippi State Highway Department C. E. Murphy was Project Engineer. The Department is headed by R. A. Harris, Chief Engineer, with S. A. Tomlinson, Jr. as Construction Engineer and J. W. Kornrumpf as District Engineer.



## FASTER LOADING, LIFTING, SCRAPING

"The Ottawa" INDUSTRIAL Hydraulic Front-End Loader saves hundreds of man hours on every job. A rugged heavy duty attachment for industrial type tractors that loads bulk materials, does light bulldozing jobs and operates as a portable crane. A year round labor saver—will do hundreds of odd jobs better faster. Bulldozer, Boom and Snow Plow attachments available to give you maximum productive use of your industrial tractor.

Fits most models of industrial tractors. Write today for prices and illustrated bulletin. IMMEDIATE SHIPMENT.

**Ottawa**

**STEEL PRODUCTS, Inc.**  
INDUSTRIAL DIVISION  
OTTAWA, KANSAS • U. S. A.

## L-O-N-G-E-R SERVICE LIFE IS SOLD WITH EVERY

Grit-proof bearings for Alemite lubricated center shaft minimize wear on hinge castings. Wide bearing surfaces also reduce wear and assure permanent shell alignment.

Owen hinge stop design holds bottom sheave block up-right and broad counterweight is shaped to protect cables and sheaves from contact with abrasive materials. Yes, Longer Service Life is sold with Every Owen Bucket.

### THE OWEN BUCKET COMPANY

6030 BREAKWATER AVE. • CLEVELAND, OHIO  
BRANCHES: New York, Philadelphia, Chicago, Berkeley, Calif.

A MOUTHFUL AT EVERY BITE

**Owen  
Bucket**



## MARTIN CARRYHAUL TRAILERS

TRADE MARK REGISTERED



Your "CATERPILLAR" Dealer is your MARTIN Dealer. See him for your trailer needs.

**MARTIN MACHINE COMPANY**  
KEWANEE, ILLINOIS

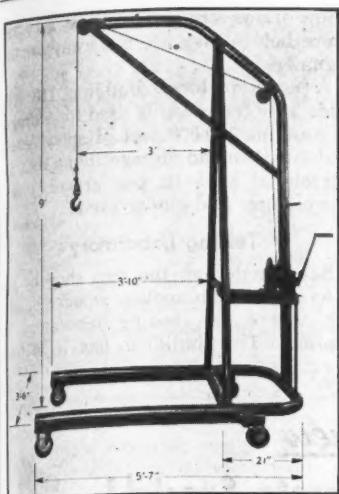
### MARTIN CARRYHAUL TRAILERS "Make Hauling A Pleasure!"

Ease of loading, dependability and economical operation are three Martin CARRYHAUL Trailer characteristics which make them the leaders in the field. Regardless of your hauling job, there's a proper size Martin CARRYHAUL Trailer to do it for you safely and economically.

Are your copies of C. & E. Monthly coming to the right address? Would your home address be better—or a field address if on a long assignment? Our Circulation Dept. will change your stencil as often as need be. Just drop a card and let us know.

CONTRACTORS AND ENGINEERS MONTHLY  
470 Fourth Avenue  
New York 16, N.Y.





The Sasgen portable shop crane features a safety spur-gear winch and positive brake action when the winch crank is stopped, whether in raising or lowering. It comes in two models.

### Portable Shop Crane

A portable shop crane featuring a patented safety spur-gear winch is being marketed by the Sasgen Derrick Co., 3101 Grand Ave., Chicago 22, Ill. The gear ratio is 7 to 1, and it is claimed that there is positive brake action wherever the crank is stopped, whether in raising or lowering.

The Sasgen crane is made in two models. One has a maximum lift under the hook of 7 feet; the other lifts 8 feet 6 inches. Both have a maximum capacity of 3,000 pounds. The overhang on both models is 3 feet. Width of bed is 3 feet 6 inches inside and 4 feet on the outside.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 50.

### Curing Compound Now Offered in Four Types

The Techkote Co., 821 W. Manchester Ave., Inglewood, Calif., has announced the addition of a Gray-Pigmented type to its line of Sealtext curing compounds. These compounds are of a low viscosity and can be applied with hand or power-operated sprayers. They are available in the seventeen western states.

Sealtex clear curing membrane contains a fading dye. This dye marks the areas treated, to insure complete coverage and to avoid waste, but fades out in a few days leaving the concrete its natural color. Sealtext White-Pigmented was developed for use where concrete may be subjected to elevated temperatures due to heat absorption from the rays of the sun. The white pigment reduces heat absorption, bringing thermal stresses to a minimum. Sealtext Gray-Pigmented is also designed for temperature reduction, while at the same time it reduces glare, which is particularly desirable in highway work. Sealtext Black is a low-cost compound for use where appearance of the finished concrete work and heat absorption are not important factors.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 15.

### Wire-Rope Line Described

A catalog containing 20 pages of information for users of wire rope has been put out by The Upson-Walton Co., 700 Perry-Payne Bldg., Cleveland 13, Ohio. Catalog 46-W explains wire-rope construction, maintenance, types of cores, types of lays, and shows cross-sectional areas of the various styles of wire rope. It also gives price lists, approximate weights, and breaking

strength for the various sizes and types. Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 58.

### Personnel Shifts for SKF

Three changes in the personnel of its district offices have been announced

by SKF Industries, Inc., of Philadelphia. Roy C. Norton, Jr., has been appointed field engineer for the Hartford, Conn., district office; I. J. Torkelson, field engineer, has been transferred from Chicago to Milwaukee; and R. M. Parrish has been added to the sales staff of the Portland, Oreg., district office.



**GATKE**  
*Custom-Bilt*

**BRAKE BLOCKS  
and LINERS**

**Gatke CUSTOM-BILT BRAKE LININGS**  
BLOCKS SETS ROLLS SHEETS  
**GATKE CORPORATION**  
228 N. La Salle St., Chicago 1, Ill.

Whether it's heavy or light equipment—trucks or tractors and trailers—long hauls or short—hills or heavy traffic—whatever the service, the smooth, non-grabbing action and extra wear life of GATKE CUSTOM-BILT Brake Blocks add miles to tire life and help keep equipment fit for the road with minimum maintenance.

RESULTS TALK. Just use GATKE CUSTOM-BILT Brake Blocks for your next five relines and compare.

Ask your GATKE Jobber or write.

**Keep digging machines DIGGING**



The Points on your digging machines are the usual cause of costly delays and needless trouble...but with reversible, self-sharpening JIFFY POINTS (an entire set can be changed or reversed in a matter of minutes) you eliminate this source of trouble.



FAST DIGGING is accomplished by Sharp Points properly designed and engineered for the job...JIFFY POINTS, through their exclusive reversible feature, are always sharp...the entire point is heat treated for proper hardness to afford long life.



REPLACEMENT is accomplished with a tap of the hammer...the new point is inserted without the use of bolts, wedges or crimping. Its digging time that counts, and with JIFFY points on your machine, you're far ahead in digging time every day.

ADAPTERS are available for practically all types of buckets and are easily installed. AVAILABLE through your distributor or order direct from us. Let our engineer show you how to convert your machines and end costly delays... wire or write us today.

**Jiffy Products Company**

Phone Taylor 9567

4325 Elm Street Dallas, Texas



DOWEL ALIGNMENT BEING CHECKED BY SPIRIT LEVEL

HIGHWAY DEPARTMENTS REQUIRE DOWEL ALIGNMENT CHECKED BEFORE CONCRETE PLACING.

LACLEDE DOWEL SPACERS ALIGN DOWELS HORIZONTALLY AND VERTICALLY ON ALL TYPES OF SUBGRADES AND MAINTAINS EXACT ALIGNMENT DURING CONCRETE POURING.

ELIMINATE COSTLY FIELD ADJUSTMENTS—USE LACLEDE DOWEL SPACERS.

**LACLEDE STEEL COMPANY**

ST. LOUIS, MISSOURI





The lightweight Depco water pump comes in 2,000, 3,000, and 4,000-gph sizes. It is powered by a two-cycle gasoline engine, and has only one moving part.

### Portable Water Pump

A gasoline-engine-driven water pump is now in production at the plant of the Diesel Pump & Electric Mfg. Co., 110 W. Broadway, Glendale, Calif. These lightweight Depco pumps are available in sizes of 2,000, 3,000, and 4,000 gph. And plans are under way for the introduction of a portable self-priming 6,000-gallon model.

The pump is made with a vertical-shaft arrangement. The only moving part is a cast-bronze impeller with a stainless-steel shaft, directly coupled to the engine crankshaft. The engine is of the two-cycle type, and uses anti-friction bearings. It is made of a high-pressure aluminum-die-cast alloy, and is equipped with a patented scavenging system. Easy starting is aided by the use of a built-in high-tension magneto which utilizes Alnico V permanent magnet material in the magneto rotor.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 47.

### Wire Hose Bands

Tight-fitting bands for holding hose to hose couplings are manufactured by the Erco Mfg. Co., 4010 W. Montrose Ave., Chicago 41, Ill. Made of rust-proof galvanized-steel wire, they are available for all sizes of hose from 1/4 inch to 6 inches in diameter. The Grip-Tight hose bands are applied by means of a special tool without the need for a bench or vise.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 27.

U. S. Savings Bonds are a good investment. Buy them regularly!

## County Shop

(Continued from page 2)

The roof is of asphalt-coated paper on wood. The original wing is heated by an oil burner with Herman Nelson blowers hung up in the corners to circulate the heat around the shop.

The first door on the west end opens into the auto-repair shop which is partitioned off from the rest of the wing by a concrete-block wall. This room is 16 feet wide and extends the depth of the shop. In one corner is a Brunner air compressor which pipes air at 150-pound pressure throughout the building to convenient outlets. Along the west wall is a Hartman battery charger where three batteries may be charged at a time; a Champion spark-plug cleaner; a Barrett brake-relining and grinding machine; a Buffalo No. 18 drill press; a Sunnen bushing hone; and an Allen 250-amp electric welder. Mounted on a workbench is a 4-inch vise, and a South Bend lathe with a 9-inch swing and a 4 1/2-foot bed.

Hanging from a beam running the depth of the shop is a Wright 1 1/2-ton hoist. Along the east wall is a Manley hand press for bushings and a Black & Decker 6-inch heavy-duty grinder, both mounted on a workbench; and a General armature growler. Other equipment includes a Black & Decker set of valve-reseating stones; a Blackhawk Porto-Power unit for straightening bodies; a Little Giant tap and die set; and a Walker 2-ton floor jack. Cars are painted with Binks spray guns and dried with a 5-bulb battery of lamps.

In the adjoining wing where the trucks are repaired, a 50-foot overhead beam carries a Yale 10-ton chain hoist. Overhead lights furnish general lighting, while fluorescent lights are supplied at the workbenches. This shop has a Curtis 5-ton electric cable lift for raising equipment in the air for greasing or repairs; it also is equipped with a grease pit.

On a bench along the rear and east walls are a battery charger for charging two batteries at a time; a Van Dorn 8-inch ball-bearing bench grinder; a Van Norman YW valve refacer; a reamer for honing piston walls; a U. S. Electrical Tool 8-inch sander; a 5-inch bench vise; and a Black & Decker No. 60 heavy-duty 5/8-inch electric bench

drill. In the northwest corner of the shop is a washroom and lavatory. Water is pumped from a deep well.

### Other Buildings

Seven feet east of the main garage is another wooden storage building 63 feet wide x 33 feet deep. It contains small tools, paints, and miscellaneous equipment. A crushed-stone road passes around the rear of the buildings and goes back to a large storage yard in the rear. There concrete posts are made and stored, along with such items as galvanized pipe, creosoted bridge timbers, and stockpiles of sand and gravel.

Snow plows are painted and serviced there before they are put away for the summer.

A concrete-block building 110 feet wide x 30 feet deep is used for storage. It contains 100,000 feet of snow fence, and sundry dead storage items such as barrels of asphalt, pea gravel, blue-stone chips, and cinder sand.

### Testing Laboratory

Separated from the sign shop by an 8-foot opening is another wooden building where the testing laboratory is housed. This building has a 30-foot

(Concluded on next page)

## Here's the new CON-VAY-IT Concrete Special!

It's unsurpassed in its ability to speed up the movement of wet concrete from mixer to forms. With CON-VAY-IT Special you'll pour concrete faster, and at but a fraction of your normal labor cost. Available with either gas engine or electric motor drive.



Construction men in all parts of the country are using this highly efficient Concrete Conveyor with great success... and claim it has saved them many thousands of dollars annually. You should know about CON-VAY-IT Special — write for details TODAY.

AMERICAN CONVEYOR CO.

1115 WEST ADAMS STREET  
CHICAGO 7, ILLINOIS



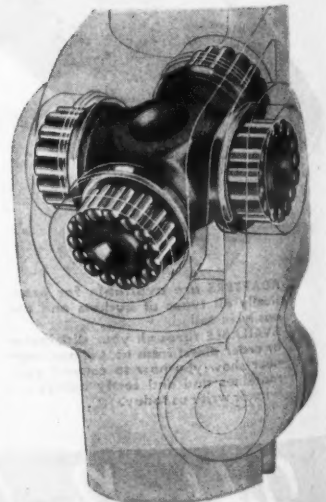
MECHANICS  
Roller Bearing  
Universal Joints

## A Size and Type For Every Use

MECHANICS Roller Bearing UNIVERSAL JOINTS are available in single, double and close-coupled types in all sizes suitable for applications requiring from 200 to 50,000 foot pounds torque.

The once-a-season or lifetime lubrication feature of MECHANICS joints makes frequent stops for lubrication unnecessary. This helps avoid delays and breakdowns caused by insufficient lubrication.

Let our engineers show you how this and other advantages of MECHANICS Roller Bearing UNIVERSAL JOINTS will benefit your new models.



MECHANICS UNIVERSAL JOINT DIVISION

Borg-Warner • 2026 Harrison Ave. Rockford, Ill.



Yes, sir—the load really seems lighter when it's carried in one of these easy-wheeling Sterling barrows. For these sturdy Sterlings are equipped with smooth-running anti-friction bearings. Scientifically designed... well-balanced... actually 80% of the load is carried by the wheel; only 20% by the operator. While deliveries are still retarded, due to the material situation, we'll make every effort to serve you as soon as conditions permit.

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Look for this Mark of  
STERLING Quality

**Sterling**  
WHEELBARROWS



## County Shop

(Continued from preceding page)

front. It is also built on a jog on the west side going back 10 feet from the front, then in 13 feet, and finally back 21 feet more. With soil stabilization playing a most important part in the construction program of the Highway Department, the laboratory is a very essential unit.

Suffolk County can boast of some excellent deposits of road-building materials, such as sand, gravel, and loam. And the job of the lab is to develop graded mixes of these materials for use in the foundation and base courses of the new roads. Besides the soils research, all road-building materials are tested there.

The quarters are at present somewhat cramped. But plans are now being made for a new fireproof concrete-block building, two stories high, measuring 30 x 60 feet. This building will contain a damp-curing room. It will provide ample space for the modern equipment now in use in the present wood building, and also for a 300,000-pound compression machine.

When a new road is to be constructed, samples of the soil along its entire length are brought to the laboratory for analysis. Such information as shrinkage values, plasticity limits, and how the soil can be consolidated is determined. The tests show what is lacking in the soil, and which materials must be added to it to bring it up to an A1 standard.

California-bearing-ratio tests are taken on American Instrument Co. apparatus. Other important equipment includes a Precision constant-temperature bath, oven, and water bath; a Tinius Olsen briquet machine and humidity cabinet; an International soil centrifuge; an American force-draft drying oven; a Ro-Tap and sieves; a Fairbanks scale; a Christian Becker balance; and Rainhart apparatus for taking into the field to determine the density of the finished base or foundation course.

Adjoining the laboratory is a wooden building with a 40-foot front and 30-foot depth. The western part of this building is given over to offices, and is where the Maintenance Engineer has his headquarters. The east wing with three doors in front is used for storing such materials as salt, calcium chloride, cement, paints, etc. Between this storehouse and the next building to the east is a 12-foot opening. There the gasoline pump is located over a 2,000-gallon tank buried in the ground. A 1,000-gallon diesel fuel tank is located

in the rear yard.

### Personnel

A force of 12 are employed at the Yaphank center including the two engineers at the testing laboratory, a stock-keeper, a carpenter, a bookkeeper, two painters, four mechanics, and a night watchman.

### Gears, Dredge and Hoist Machinery Is Described

Twenty-four pages of pictures, blueprints, and text make up the latest catalog of The Earle Gear & Machine Co., 4713 Stenton Ave., Philadelphia 44, Pa. The Earle line includes such products as spur gears and pinions, bevel and miter gears and pinions, heringbone and hobbed-type gears and pinions, worm gears and wheels, various non-metallic gears, racks, sprockets, sheaves, and special machinery used in operating dredges, bridges, gates, hoists, and others.

The catalog contains necessary ordering information. It also has a section devoted to relevant formulae.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 91.

Equipment breakdowns are costly and eat into job profits. Regular servicing and proper lubrication will keep your machines working longer and with more efficiency.

## CUMMER ASPHALT PLANTS

EIGHT SIZES  
Up to 1000 Tons per day

DRYERS  
Two-Fire and Internal  
Fire

30 to 100 Tons per hour  
Electric Batch Timers

50 Years' Experience

THE F. D. CUMMER & SON CO.

EAST 17th & EUCLID  
CLEVELAND 15, OHIO

### J. W. Stang Wellpoint System FOR SALE

Consisting of Wellpoint Pump, Jetting Pump with 300' 6" Header Pipe—150 Swing Joints 1 1/2" pipe, valves, etc. Almost new. Will sacrifice for quick sale.

Watkins-Aldridge Equipment Co.  
Jackson, Mississippi

### SURVEYORS' TAPES For Sale

100-ft. steel surveyors' tapes, with end graduations in tenths. Used, unbroken, good condition. \$3.00 each. Send check or money order.  
HARDY-LYTTON COMPANY  
P.O. Box 411      Huntington, W. Va.

## Index to Advertisers

Acme Wire and Iron Works.....	49	Johnson Company, C. S.....	23
Aeroquip Corporation.....	27	Joy Manufacturing Company.....	7
Allis-Chalmers Tractor Division.....	45	Kewanee Boiler Corporation.....	63
All-Purpose Spreader Company.....	21	Keystone Asphalt Products Company.....	85
American Conveyor Company.....	90	Koehring Company.....	22, 23
American Hoist & Derrick Company.....	44	Kwik-Mix Company.....	23
American Steel Scraper Company.....	28	Laclede Steel Company.....	89
Ariens Company.....	35	LaCrosse Trailer Corporation.....	71
Armco Drainage & Metals Products, Inc.....	82	LaPlant-Choate Manufacturing Co., Inc.....	15
Austin-Western Company.....	54	LeTourneau, Inc., R. G.....	92
Bacharach Industrial Instrument Co.....	85	Lewis Manufacturing Company.....	51
Barber-Greene Company.....	14	Linn Manufacturing Corporation, The.....	31
Barco Manufacturing Company.....	65	Littleford Bros., Inc.....	86
Barrett Division, The.....	81	Lyons, S. P.....	26
Beebe Brothers.....	9	Mall Tool Company.....	79
Bethlehem Steel Company.....	20	Marion Machine Company.....	20
Bicknell Manufacturing Company.....	70	Martin Machine Company.....	88
Blaw-Knox Division.....	40, 41	Marvel Equipment Company.....	53
Bucyrus-Erie Company.....	24	Master Vibrator Company.....	68
Buffalo-Springfield Roller Co., The.....	60	McKiernan-Terry Corp.....	72
Byers, P. L.....	85	Mechanics Universal Joint Division.....	90
Canvas Fabricators, Inc.....	79	Michigan Power Shovel Company.....	36
Carlyle Rubber Company, Inc.....	64	Miller-Hasselbalch Company, Inc.....	69
Carter Company, Ralph B.....	76	Minneapolis-Moline Power Implement Company.....	68
Chain Belt Company.....	9	Mixermobile Manufacturers.....	29
Chevrolet Motor Division, General Motors Corp.....	55	Monarch Road Machinery Company.....	39
Chicago Pneumatic Tool Company.....	18, 19	Morse-Starrett Products Company.....	78
C. I. T. Corporation.....	70	Murphy Diesel Company.....	79
Cleaver-Brooks Company.....	75	Oakite Products, Inc.....	55
Complete Machinery & Equipment Co., Inc.....	21	Oliver Corporation, The.....	58
Concrete Forms Corporation.....	74	Onan & Sons, Inc., D. W.....	80
Concrete Surfacing Machinery Co.....	54	Osgood Company, The.....	83
Construction Equipment & Mfg. Co.....	87	Ottawa Steel Products, Inc.....	88
Continental Decalcomania Company.....	81	Owen Bucket Co., The.....	88
Continental Rubber Works.....	32	Page Engineering Company.....	30
Conveyor Company, The.....	80	Parsons Company.....	23
Cummer & Son Co., The F. D.....	91	Pettibone Mulliken Corporation.....	64
Davenport Besler Corp.....	27	Philadelphia Textile Finishers.....	80
Davey Compressor Company.....	71	Pioneer Engineering Works, Inc.....	28
Detroit Diesel Engine Division, General Motors Corp.....	34	Pneumatic Tool Sales & Repair Company, Inc.....	26
Dewey and Almy Chemical Company.....	37	"Quick-Way" Truck Shovel Company.....	39
Diesel Pump and Electric Mfg. Company.....	14	Rock Bit Sales & Service Company.....	66
Disston & Sons, Inc., Henry.....	33	Rockford Clutch Division.....	87
Dodge Division of Chrysler Corp.....	38	Roeth Vibrator Company.....	11
Dorsey Trailers.....	61	Roger Wilco Company, Inc.....	91
Duff-Norton Manufacturing Co., The.....	72	Rogers Brothers Corporation.....	56
Duplex Truck Company.....	84	Sasgen Derrick Company.....	75
Eagle Crusher Company, Inc.....	59	Scott & Son Company, O. M.....	65
Electric Steel Foundry.....	83	Seaman Motors, Inc.....	10
Electric Tamper & Equipment Company.....	60	Shunk Manufacturing Company.....	52
Erie Steel Construction Company.....	84	Silver Booster Manufacturing Co.....	16
Euclid Road Machinery Company, The.....	11	Simplicity System Company, The.....	25
Evans Products Company.....	25	Sinclair Refining Company.....	8
Flink Company.....	74	Standard of California.....	63
Foote Co., Inc., The.....	37, 82	Sterling Machinery Corporation.....	38
Ford Motor Company.....	5	Sterling Wheelbarrow Company.....	90
Galion Iron Works & Mfg. Co., The.....	31	Stoody Company.....	10
Gatke Corporation.....	89	Stulz-Sickles Company.....	42
General Excavator Co., The.....	83	Symons Clamp & Mfg. Company.....	8
Gledhill Road Machinery Co.....	50	Texas Company, The.....	3, 12, 13
Grieve Company, G. P.....	49	Thew Shovel Company, The.....	17
Griffin Wellpoint Corporation.....	24	Tonawanda Engineering Company.....	86
Haiss Manufacturing Co., Inc., George.....	16	Tuthill Spring Company.....	73
Hayward Company, The.....	67	Unit Crane & Shovel Corp.....	51
Heltzel Steel Form & Iron Company.....	30	United Laboratories, Inc.....	74
Hendrix Manufacturing Co., Inc.....	48	United States Rubber Company.....	69
Hetherington & Berner Inc.....	56	Universal Engineering Corp.....	43
Hobart Brothers Company.....	48	Van Dorn Electric Tool Company, The.....	61
Homestead Valve Mfg. Co.....	32	Victor Equipment Company.....	34
Huber Manufacturing Company, The.....	42	Vulcan Tool Manufacturing Company.....	57
Hughes Company, L. J.....	79	Walter Motor Truck Co.....	73
Independent Pneumatic Tool Company.....	67	War Assets Administration.....	76
International Harvester Company.....	35, 62	Warren-Knight Company.....	59
International Vibration Co., The.....	66	Waterloo Foundry Company.....	16
Iowa Manufacturing Company.....	44	Waukesha Motor Company.....	57
Jaeger Machine Co., The.....	36, 77	Wellman Company, S. K.....	77
Jahn Company, C. R.....	62	Wellman Engineering Company, The.....	78
Jiffy Products Co.....	89	White Manufacturing Company.....	45
		Wico Electric Company.....	50
		Williams Form Engineering Corp.....	58
		Worthington Pump & Machinery Corp., Worthington-Ransome Construction Equipment Division.....	53
		Wright Trailer Company.....	86
		Yaun Dragline Buckets & Mfg. Plant.....	52

## SAVE 30% to 60% NEW TRUCK TIRES

### Low-Bed Trailer Tires

8.25-15 Goodyear 14-ply .....\$39.25 ea.  
(Reg. List Price \$101.48)  
10.00-15 U.S. Royal 14-ply .....\$57.50 ea.  
(Reg. List Price \$115.22)

### Heavy-Duty Truck Tires

14.00-20 Firestone 16-ply .....\$145.00 ea.  
(Reg. List Price \$291.58)  
14.00-24 Goodrich 16-ply .....\$154.00 ea.  
(Reg. List Price \$309.64)

### BRAND NEW FIRST QUALITY

### RAYON CONSTRUCTION CONVENTIONAL TREAD

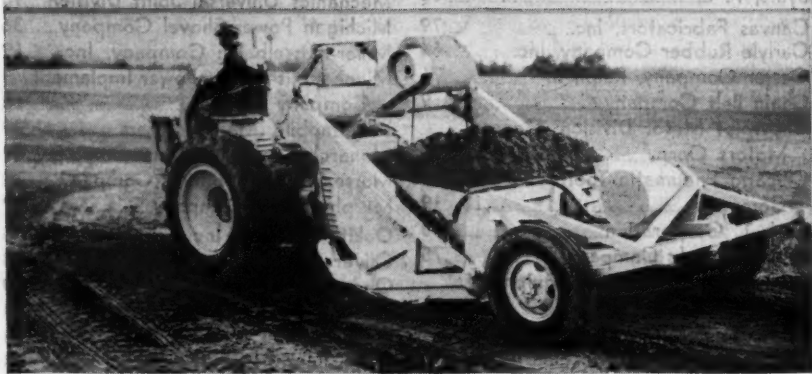
Other sizes in stock at low prices.

ROGER WILCO CO., Inc.  
3230 Broomall St., Philadelphia 43, Pa.  
Telephone Allegheny 4-9491



# Contractors *and* Engineers Monthly

## Get orders in now for **NEW D TOURNAPULL** the dirtmover's handyman



**Grading building sites**—You will find this small, fast Tournapull extremely useful on subdivision work, grading for small industrial plants and building sites. Excellent for landscaping. Rig is self-loading . . . works alone or in fleet operation.



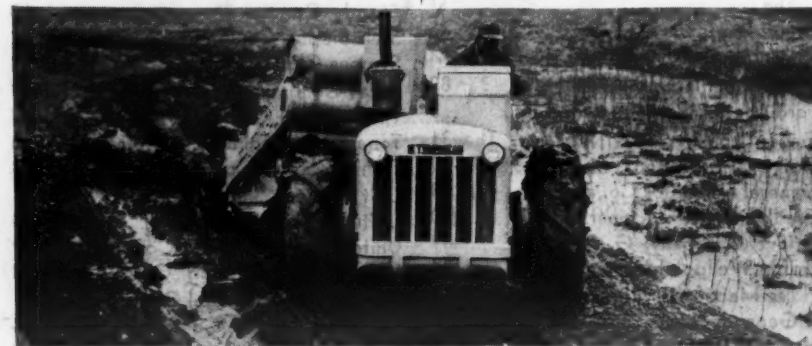
**Industrial maintenance**—On small yardage jobs around yards, shops . . . material handling, spur track grading, etc, one man with D Tournapull can handle complete job in minimum time . . . move fast, job-to-job at 23 m.p.h. on road or cross country.



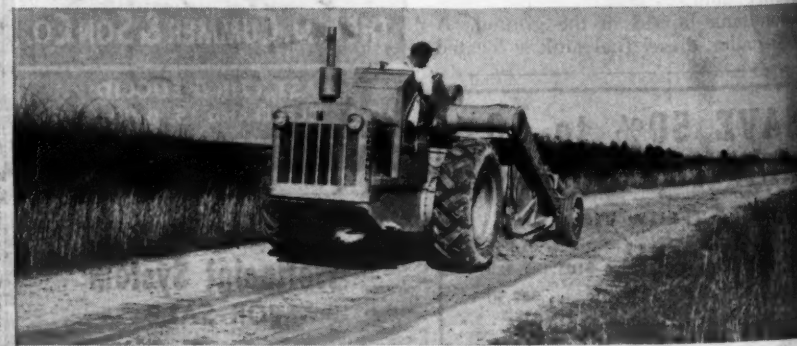
**Material handling**—If you have material stockpile problems . . . coal, cinders, crushed stone, ore, fertilizer, chemical . . . here is a handy one-man self-powered Carryall . . . will load, haul, pile, spread, or dump from ramp to cars, trucks, or conveyors.



**Leveling farm land**—Fits the small land-leveling job, useful auxiliary on big projects. Makes money on scattered jobs, good rig for stock pond excavation. Can terrace, grade and gravel farm roads, build dirt dams, spread black dirt, or reclaim peat land.



**Stripping light overburden**—A versatile utility dirt-mover around mines, quarries, sand and gravel plants, clay pits. Strips light overburden, cleans up in pit, clears slides, gravels roads, handles drainage. Will haul where trucks stall.



**Road maintenance**—Makes quick repairs anywhere in the county anytime. 20 miles is less than an hour away, no time lost loading equipment, no trailer needed. Hop on and go, move your dirt, move on. One man does the job.

Tournapull, Carryall—Trademark Reg. U. S. Pat. Off. 21134

**LETOURNEAU**  
PEORIA, ILLINOIS



**TOURNAPULLS**